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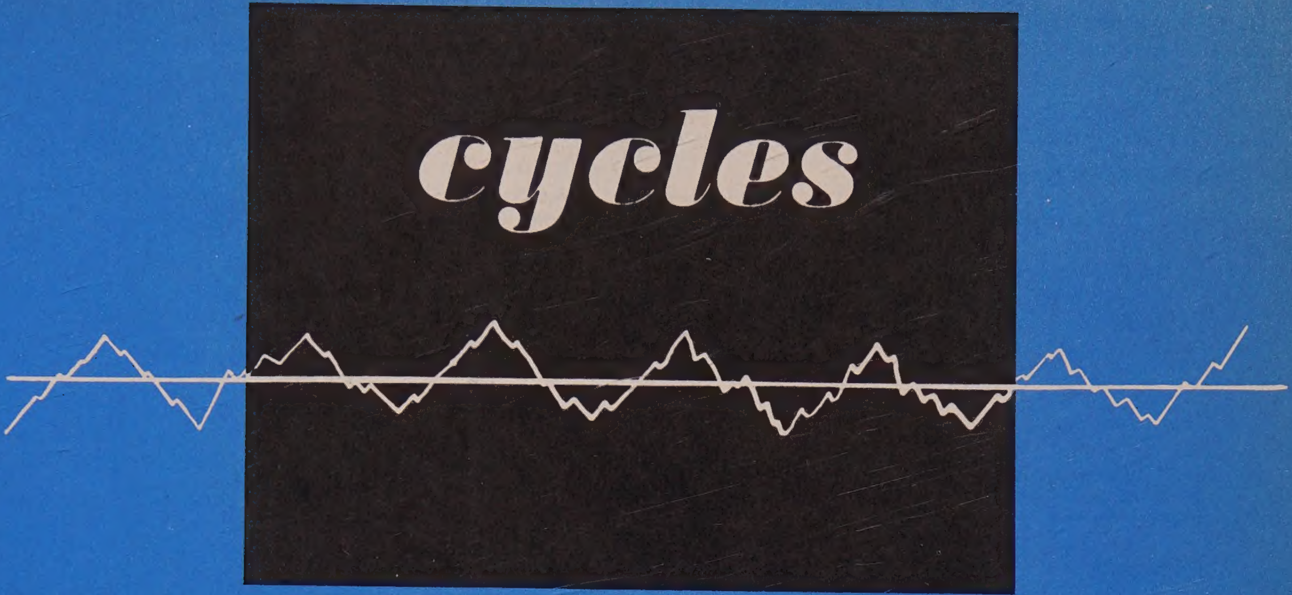

July 1958

FOUNDATION FOR THE STUDY OF CYCLES
New York, New York

CYCLES JULY 1958, VOLUME IX, NUMBER 7

THE OFFICIAL BULLETIN OF THE FOUNDATION FOR THE STUDY OF CYCLES

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Cycles is published by the Foundation for the Study of Cycles monthly at the Foundation's office at East Brady, Pennsylvania. Subscription rate $10.00 a year. Entered as second class matter at the post office at **East Brady, Pennsylvania**, with additional entry at Dexter, Michigan. Publication office, 680 West End Avenue, New York 25, New York.

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THE DIRECTOR'S LETTER

Dear Member:

THE 17 WEEK CYCLE IN STOCK PRICES

The lead article in this report is about the 17-week cycle in industrial stock prices. The research was done and the report was written by Miss Gertrude Shirk, one of the country's best cycle analysts.

I found myself particularly interested in this article for two reasons. First, it marks the advance of cycle study into the field of short term market cycles. Second, it gives scientific support to what, until now, has been merely broker's folklore.

The advance of the Foundation into a study of short term market cycles is most important. First of all, it gives *you* the sort of information *you* want. Second, it is important scientifically.

When to Buy & When to Sell

You want information about short term market cycles in order to know better when to buy and when to sell. Miss Shirk's work is a first step in this direction. When used in conjunction with a knowledge of other short term cycles and/or other information it could be very profitable indeed. Work in regard to other short term cycles is already in progress and will be reported upon soon.

However, you don't need to await the results of this other research. Miss Shirk's work in respect to the 17-week cycle blazes a trail that you yourself can follow in connection with group averages, and in the fluctuations of individual stocks.

Scientific Importance.

The work of the 17-week cycle is important scientifically, too. A cycle as short as this repeats many, many times in the available data. Even in the 10 years encompassed by Miss Shirk's study it has had an opportunity to repeat 32 times. In the entire span of weekly industrial stock price data available it has time to repeat over 188 times! So many repetitions, if they are found to exist, would supply almost incontrovertible proof of the statistical significance of the cycle. Even more important, so many repetitions provide an opportunity to study variations of cycle length and cycle strength and to test various theories of cycle cause and effect.

Economic Figures are of Great Scientific Usefulness

The fact that figures are available weekly is one of the advantages of economic data. In a corresponding series of wild life figures, where records are available on an annual basis only, you would need 3,200 years of figures to be able to get results of comparable scientific usefulness—and such figures just simply do not exist.

Of course the circumstance that the work has practical usefulness worries some of our scientist friends particularly our British cousins. From the point of view of such people, if the results are *useful* the work isn't "scientific"! Fie upon such a point of view! Immediate usefulness should not be the *object* of scientific research, but if it should happen to be a *result*, there should be no derogation.

Practical Value

Miss Shirk's work in respect to the 17-week cycle in industrial stock prices does have, I am glad to say, immediate practical usefulness. It is *not* advanced as a formula for trading, but it gives you the *odds* in connection with trades at the specified times. For example for the ten years under review the cycle has prevailed in 22 out of the 31 round trip trades. If this cycle continues in the same way in the future, the odds are thus 2 to 1 that prices will be first higher, then lower, at the stated dates. Again if, as you should, you think of a 17-week cycle as 8½ weeks of relative strength followed by 8½ weeks of relative weakness, you will find 21 out of the 31 highs, or 2 to 1, falling in the high zone, 19 out of 30 lows falling in the low zone. And so on.

Folklore Confirmed

The second reason that I find myself so interested in this month's lead article is that it gives scientific verification—for the period studied—to what, up to now, has been merely broker's folklore. A great deal of folklore is mere superstition, but much of it has foundation in fact. I believe in investigating folklore. Such investigations are often most fruitful.

Will the Cycle Continue?

The usefulness of knowledge of the 17-week cycle depends upon whether or not it continues. In a cycle which is as small as this one, relative to total market movements, we should go back much further than 1948 in order to get the greatest possible assurance of significance. This will be done.

You may ask, if 20 years, or 40 years, or 60 years experience should be used to validate this cycle, why was this work not done before we reported?

There are three reasons: First, we wanted to get the results already achieved into your hands at the earliest possible moment. Second, we lacked the staff to do more work in the time available. And third, even if these two reasons had not been compelling, it is better to do the job in sections. A cycle which continues *after* discovery is many times as convincing as one you find in the figures you are looking at.

Further Research Required

This last statement may require a bit of explanation. Let's say you look at figures 1948—1957 for cycles 14 to 20 weeks long. You are free to select any cycle length you find—14, 14½, 15, 15½, 16, 16½ and so on. However, having selected one length—let us say 17 weeks—you are committed and when you look at the next ten years—either forward or backwards—you have no flexibility. Obviously it is harder to find some particular predetermined length than it was to find *any* length, as in the first instance.

The next step therefore is to do the job over for the period 1938—1947, then for the period 1928—1937, and so on.

Other Short-Term Cycles

If you will look at the charts on pages 150—153 you will see that the 17-week cycle is first strong and clear, then weak and confused, then strong and clear, and so on. This behavior could be the result of other cycles of closely related wave length which alternately combined with the 17-week cycle to make it stronger, and then offset it, to make it weaker. These other cycles are being investigated and will be reported upon. If they can be verified they can be projected and combined with the 17-week cycle to give much more useful foreknowledge.

THE SEASONAL CYCLE OF UNEMPLOYMENT

There is nothing truer than the old adage, "Figures don't lie, but liars figure."

Next below the kept slaves of the advertising world I would rank the kept statisticians, hired to produce figures which "prove" this or that, at the bidding of their masters. Fortunately at the Foundation for the Study of Cycles, we are not kept, so I am free to state Truth (as I see it).

I hope the article about the seasonal cycle of unemployment will help you to keep from being taken in by those politicians and others who use (*misuse*) figures to create a false impression. To call the 2% decrease in unemployment from March to April "good" when the normal decrease from March to April is 10% is just plain dishonest. I'm sure that the folks who resort to such statements do it with the best of intentions, but it's dishonest just the same. A decline in unemployment that is only one-fifth of what it should be is *not* good, no matter who says it is.

Unemployment Is Avoidable

We can eliminate any amount of present unemployment we really want to. If you wish a better understanding of the cause and cure of the present business set-back, write to a friend of mine:

Dr. F. A. Harper
30 South Broadway
Irvington-on-Hudson, New York

for a free copy of his article:

"Unemployment Is Avoidable"

Get one copy of this paper without charge, but please send 10¢ to cover mailing costs. (Additional copies can be bought, 7 copies for a dollar.) Write today.

Cordially yours,

Edward R. Dewey

Director

Research by Staff

THE 17-WEEK CYCLE IN INDUSTRIAL STOCK PRICES

BY GERTRUDE SHIRK

In the April issue of *Cycles* we published a letter from a member about short cycles in the stock market.

In the letter this member said, "There also seems to be a 17-week cycle . . . Old timers used to call this the cycle of 84 day tops. Allowing for one holiday about every 17 weeks this is close enough."

We have checked this old market saw and found that there is indeed a 17-week cycle in stock prices. The cycle is not a dominant one, and it is at times mixed up with other cycles, but nevertheless it appears to be present throughout the period we studied.

Characteristics of the Cycle

The 17-week cycle has an amplitude of 1.2% of trend at time of crest and 1.1% of trend at time of trough, on the average.

Although this is a small amplitude for a single crest or trough, it amounts to 2.3% (of the 17-week trend) overall from a crest to a trough, or for one leg of the cycle. There are six legs (ups and downs) per year, or over 12% a year accountable to this one small cycle.

The time of the last ideal high was the week of March 19 and the next ideal high is due the week of July 16. These dates are for this cycle only and *do not* refer to the market in general.

Computation of the Cycle

The figures we used for the analysis are Standard and Poor's Industrial Stock Price Index. We used the Index at the close on Wednesday of each week to represent the week, and we covered the period from the beginning of 1948 through May 14 of this year in the work.

The actual data are plotted as Curve A of Figure 2 which is printed on the next four pages.

Curve B of Figure 2 is a 17-week moving trend of the data in Curve A.

Our computation of the 17-week cycle is based on the difference between the two lines: Curve A less Curve B. The individual differences (deviations) are plotted as Curve C on the chart.

Curve C is drawn on an exaggerated scale for purposes of illustration. If the scale were not exaggerated, any point on Curve C would measure the distance between the corresponding points of Curves A and B.

When Curve C is split into sections of 17-weeks each and all the sections averaged together, a typical 17-week pattern is obtained. A picture of this average pattern is shown below as the solid line in Figure 1.

An "ideal" pattern is derived from the typical 17-week pattern, and the ideal pattern is shown below as the broken zig-zag line.

The ideal pattern is repeated over the entire period and is shown by the broken zig-zag line, Curve D of Figure 2.

Comparison of Curves C and D

When you compare Curve D, the ideal cycle, with

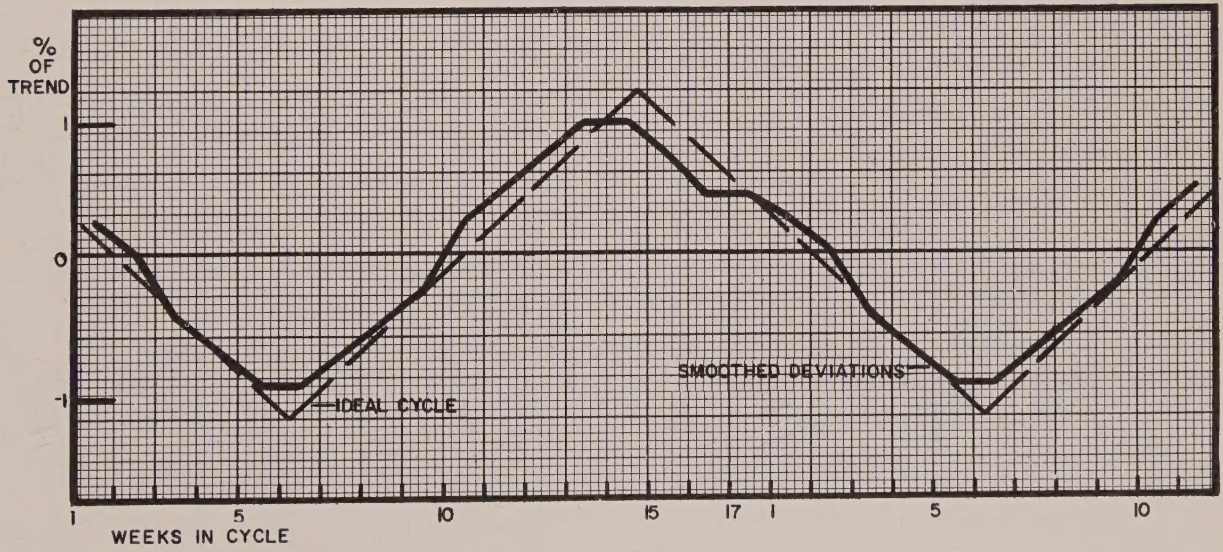


FIG. 1. STANDARD & POOR'S INDUSTRIAL STOCK PRICE INDEX, 1941-43=10

Ideal 17-week cycle vs. average of deviations when split into 17-week sections and smoothed

Curve C, the deviations on which the ideal cycle is based, you can see just how well this cycle has behaved in the past. There have been 31 repetitions of the wave in the time period we have covered. In about 20 of these the ideal cycle and the actual line of deviations follow roughly the same course. Remember that the deviations line is not smoothed.

In addition to random events which do not fall into any pattern, there are other cycles close to 17 weeks in length also present in this series. The other cycles at times reinforce the 17-week cycle and at other times wash it out.

It would be interesting to extend the work back into the period prior to 1948 to check how well the cycle operated then. But the acid test of the validity of this cycle in these figures is how

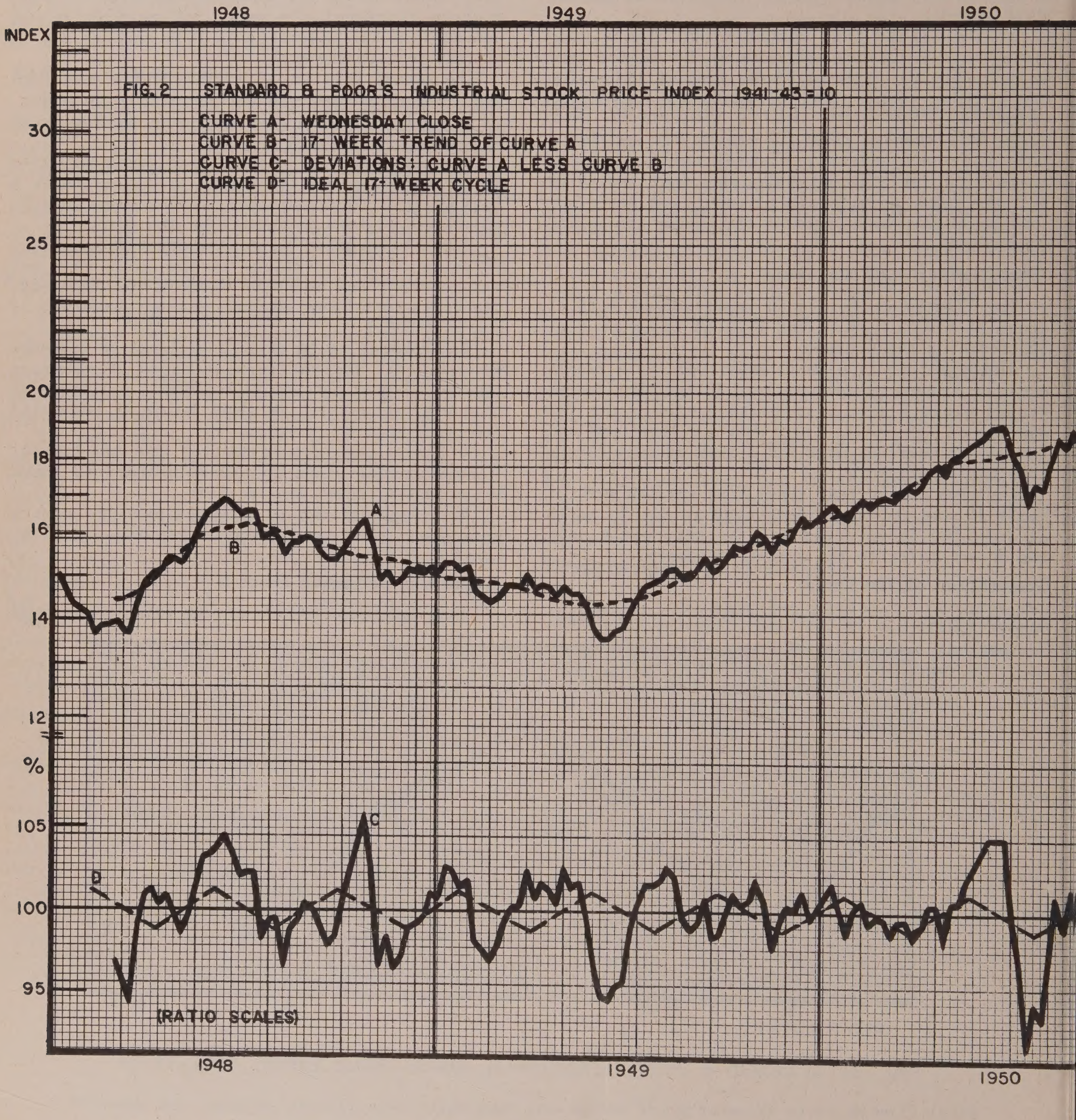


FIG. 2 STANDARD & POOR'S INDUSTRIAL STOCK PRICE INDEX 1941-43=10

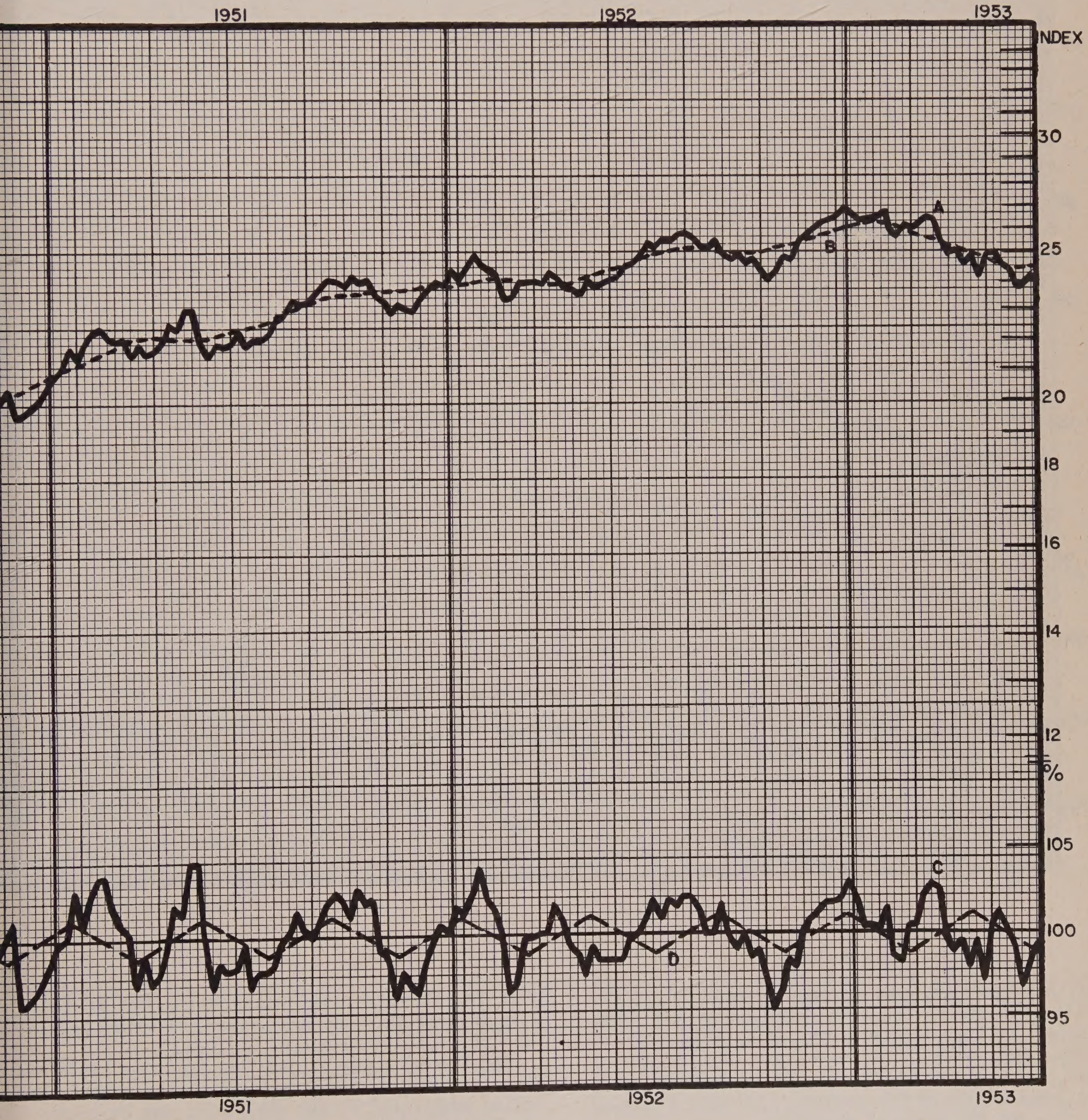
CURVE A- WEDNESDAY CLOSE
CURVE B- 17- WEEK TREND OF CURVE A
CURVE C- DEVIATIONS: CURVE A LESS CURVE B
CURVE D- IDEAL 17- WEEK CYCLE

well it continues to operate *in the future*. Time alone will answer that question.

General Application

This article gives you information about one short cycle in a general stock market index. If you had complete knowledge of this cycle, and all the other short cycles, and all the long cycles, there would still be other non-cyclic factors to take into account before you would decide to buy or sell a specific stock on a specific date. For example, when this cycle reaches a top it is a signal for a short sale. But only a fool would go short in a strong bull market which, for other reasons, could be expected to continue.

However, it is interesting to apply the timing



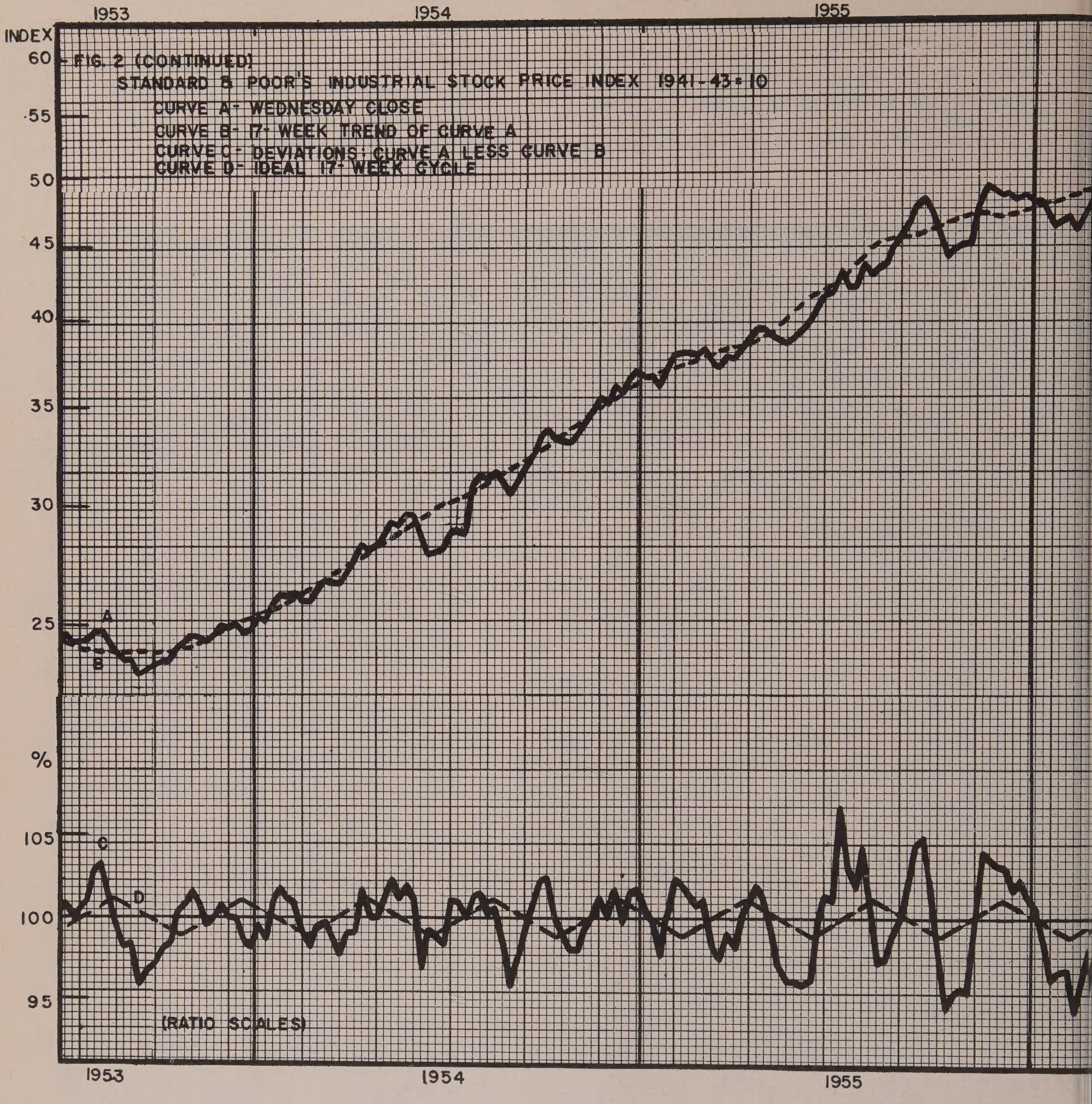
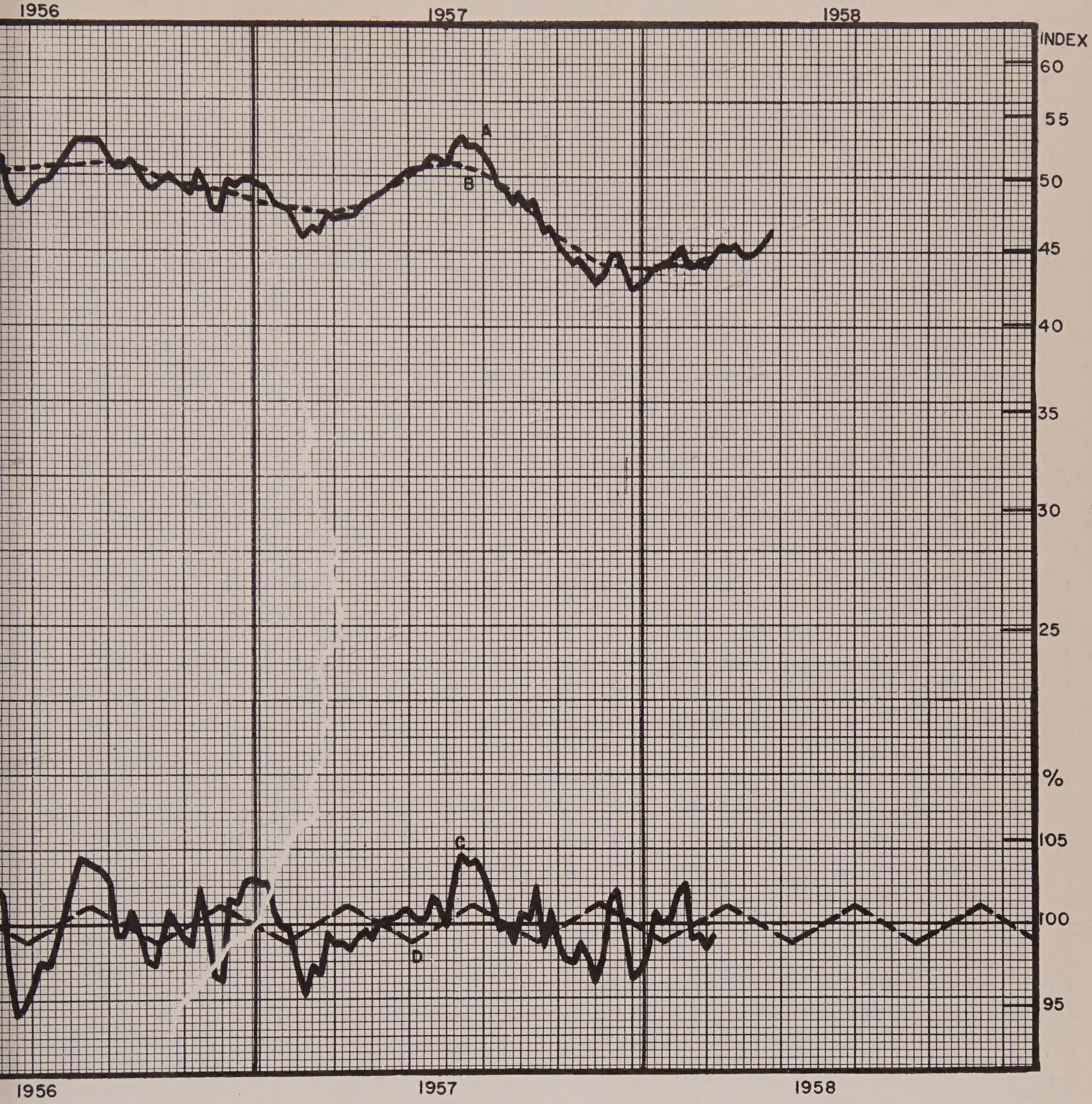


FIG. 2 (CONTINUED)
STANDARD & POOR'S INDUSTRIAL STOCK PRICE INDEX 1941-43=10

of this cycle against the actual index to see how well this cycle when considered alone has done. Table 1 on Page 154 is a buy—sell table based on this cycle only. The time of the turning points are based on the ideal wave. The Industrial Index is used as the price series, although it is of course not the price of anything.

The average profit per transaction is 1.65%. This is not enough to bother with, but in this case we used this one wave alone. It could not be used alone, advantageously.

The 17-week cycle is just one building block in the structure of cycle analysis of the market. By adding additional blocks the profit can be improved. For instance, if you use our chart which shows the combination of 11 long cycles and trend in the



stock market as a guide to time when to trade long only, and when to trade short only, and when to trade both long and short, the profit on the 17-week cycle would have doubled.

The most necessary knowledge that is lacking, however, is that of the other short waves to be used in combination with the 17-week cycle.

Another point to remember is that we are working with a general index. Each item in the index has a cycle pattern of its own. Some will have a 17-week cycle and others will not.

In working with an individual industrial stock you now know to look for a 17-week cycle because it is present in the average. If the wave is present in an individual stock it should be more prominent than it is in the average.

TABLE I

Standard & Poor's Industrial Stock Price Index

BUY-SELL TABLE BASED ON 17-WEEK CYCLE

			Long				Short				Round-Trip	
					GAIN OR LOSS				GAIN OR LOSS		GAIN OR LOSS	CUMULATED
		DATE	BUY	SELL	AMOUNT	%	SHORT	COVER	AMOUNT	%	%	%
1948	HIGH	FEB. 11					13.64					
	LOW	APRIL 7	15.03					15.03	-1.39	-9.25		
	HIGH	JUNE 9		16.73	1.70	11.31	16.73				2.06	
	LOW	AUG. 4	15.94					15.94	0.79	4.96		
	HIGH	OCT. 6		15.65	-0.29	-1.82	15.65				3.14	5.20
	LOW	DEC. 1	14.90					14.90	0.75	5.03		
1949	HIGH	FEB. 2		15.19	0.29	1.95	15.19				6.98	12.18
	LOW	MARCH 30	15.02					15.02	0.17	1.13		
	HIGH	JUNE 1		13.83	-1.19	-7.92	13.83				-6.79	5.39
	LOW	JULY 27	14.84					14.84	-1.01	-6.81		
	HIGH	SEPT. 28		15.22	0.38	2.56	15.22				-4.25	1.14
	LOW	NOV. 23	15.95					15.95	-0.73	-4.58		
1950	HIGH	JAN. 25		16.40	0.45	2.82	16.40				-1.76	-0.62
	LOW	MARCH 22	17.22					17.22	-0.82	-4.76		
	HIGH	MAY 24		18.55	1.33	7.72	18.55				2.96	2.34
	LOW	JULY 19	17.28					17.28	1.27	7.35		
	HIGH	SEPT. 20		19.30	2.02	11.69	19.30				19.04	21.38
	LOW	NOV. 15	20.03					20.03	-0.73	-3.64		
1951	HIGH	JAN. 17		21.73	1.70	8.49	21.73				4.85	26.23
	LOW	MARCH 14	21.44					21.44	0.29	1.35		
	HIGH	MAY 16		22.01	0.57	2.66	22.01				4.01	30.24
	LOW	JULY 11	22.04					22.04	-0.03	-0.14		
	HIGH	SEPT. 12		24.13	2.09	9.48	24.13				9.34	39.58
	LOW	NOV. 7	22.85					22.85	1.28	5.60		
1952	HIGH	JAN. 9		24.13	1.28	5.60	24.13				11.20	50.78
	LOW	MARCH 5	23.96					23.96	0.17	0.71		
	HIGH	MAY 7		24.03	0.07	0.29	24.03				1.00	51.78
	LOW	JULY 2	25.48					25.48	-1.45	-5.69		
	HIGH	SEPT. 3		25.57	0.09	0.35	25.57				-5.34	46.44
	LOW	OCT. 29	24.36					24.36	1.21	4.97		
	HIGH	DEC. 31		26.89	2.53	10.39	26.89				15.36	61.80
1953	LOW	FEB. 25	26.13					26.13	0.76	2.91		
	HIGH	APRIL 29		24.86	-1.27	-4.86	24.86				-1.95	59.85
	LOW	JUNE 24	24.31					24.31	0.55	2.26		
	HIGH	AUG. 26		23.85	-0.46	-1.89	23.85				0.37	60.22
	LOW	OCT. 21	24.17					24.17	-0.32	-1.32		
	HIGH	DEC. 23		24.70	0.53	2.19	24.70				0.87	61.09
1954	LOW	FEB. 17	25.92					25.92	-1.22	-4.71		
	HIGH	APRIL 21		27.98	2.06	7.95	27.98				3.24	64.33
	LOW	JUNE 16	29.52					29.52	-1.54	-5.22		
	HIGH	AUG. 18		31.65	2.13	7.22	31.65				2.00	66.33
	LOW	OCT. 13	33.23					33.23	-1.58	-4.75		
	HIGH	DEC. 15		35.68	2.45	7.37	35.68				2.62	68.95
1955	LOW	FEB. 9	38.08					38.08	-2.40	-6.30		
	HIGH	APRIL 13		38.93	0.85	2.23	38.93				-4.07	64.88
	LOW	JUNE 8	40.75					40.75	-1.82	-4.47		
	HIGH	AUG. 10		43.79	3.04	7.46	43.79				2.99	67.87
	LOW	OCT. 5	45.52					45.52	-1.73	-3.80		
	HIGH	DEC. 7		48.40	2.88	6.33	48.40				2.53	70.40
1956	LOW	FEB. 1	46.68					46.68	1.72	3.68		
	HIGH	APRIL 4		52.23	5.55	11.89	52.23				15.57	85.97
	LOW	MAY 30	48.13					48.13	4.10	8.52		
	HIGH	AUG. 1		52.92	4.79	9.95	52.92				18.47	104.44
	LOW	SEPT. 26	49.02					49.02	3.90	7.96		
	HIGH	NOV. 28		47.39	-1.63	-3.33	47.39				4.63	109.07
1957	LOW	JAN. 23	47.75					47.75	-0.36	-0.75		
	HIGH	MARCH 27		46.97	-0.78	-1.63	46.97				-2.38	106.69
	LOW	MAY 22	50.53					50.53	-3.56	-7.05		
	HIGH	JULY 24		52.65	2.12	4.20	52.65				-2.85	103.84
	LOW	SEPT. 18	48.29					48.29	4.36	9.03		
	HIGH	NOV. 20		42.93	-5.36	-11.10	42.93				-2.07	101.77
1958	LOW	JAN. 15	43.84					43.84	-0.91	-2.08		
	HIGH	MARCH 19		44.95	1.11	2.53	44.95				0.45	102.22
	LOW	MAY 14	45.84					45.84	-0.89	-1.94		
	HIGH	JULY 16										
	LOW	SEPT. 10										
	HIGH	NOV. 12										

IN 31 ROUND-TRIPS, OR 62 TRANSACTIONS TOTAL GAIN WAS 102.22%, OR 1.65% PER TRANSACTION.

SEASONAL CYCLE IN UNEMPLOYMENT

BY GERTRUDE SHIRK

There is a regular, repetitive seasonal cycle in unemployment. This is a rudimentary economic fact. In the face of it there have been some astounding pronouncements from high places.

To say that unemployment will decline in the spring is to avoid the issue completely, and to stress that unemployment will decline in the spring is to invite criticism about one's intellectual honesty.

The question is whether unemployment will decline as much as it usually does during the spring. Even if unemployment goes down some, but the percentage by which it declines is not as much as could normally be expected, then things are not better. They are worse,

Unemployment is rightly a fundamental measure of economic health but it creates so much fear in the "ins" and so much joy in the "outs" that analysis by either side is not likely to be dispassionate. I hope the work on this simple little cycle is free from prejudice because the point is important. You cannot analyse unemployment without considering the seasonal factor in it.

Figure 1 below diagrams by means of a solid line the percentage of the labor force that has been unemployed month by month since 1947. You can see that January and February are typically months of a high level of unemployment. March, April and May usually show a decline.

This type of change is seasonal, but it can be eliminated from consideration by adding a yearly trend line to the chart.

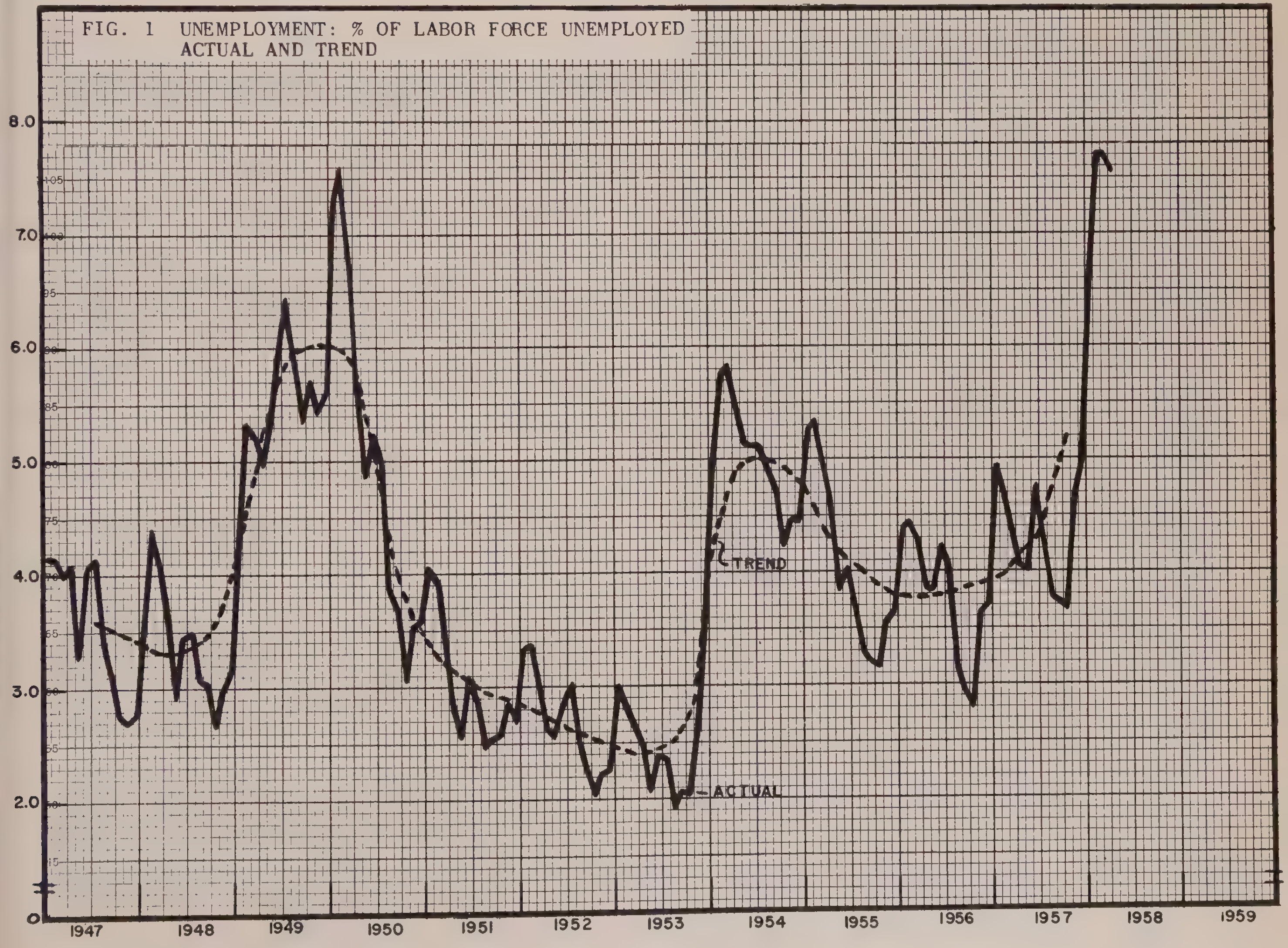
The trend line is a dashed line on the chart. It is a 13-month trend which has been smoothed by eye. The last computed figure is 5.20% unemployed at October, 1957. This is the average of 13 months beginning with April, 1957 and ending with April, 1958. It is plotted at the middle of the period.

5.20% of the labor force was unemployed last October aside from any seasonal unemployment. The seasonal is smoothed out virtually to nothing by the trend line.

The relationship between the monthly line showing the percentage unemployed and the smooth trend is the basis for the computation of the typical seasonal pattern.

Figure 2 shows this relationship year by year for the period we are considering. On Figure 2 the

FIG. 1 UNEMPLOYMENT: % OF LABOR FORCE UNEMPLOYED
ACTUAL AND TREND



trend is made flat at 100%. Figure 2 points up the usual spring decline in unemployment.

The years shown in Figure 2 are averaged together and the result is plotted in Figure 3. Here you see the typical seasonal pattern of unemployment that has prevailed since 1947.

This pattern, which is expressed as a percentage of trend, is given in the following table. The typical change from month to month and the actual change from month to month are also given.

Month	Typical Unemployment % of Trend	Typical Monthly Change	1958 Actual Per Cent Unemployed	Actual Monthly Change
Jan.	117		6.70	
Feb.	123	+ 5%	7.70	+15%
Mar.	114	- 7	7.70	0
Apr.	103	-10	7.53	- 2
May	94	- 9		
June	106	+13		
July	95	-10		
Aug.	91	- 4		
Sept.	88	- 3		
Oct.	82	- 7		
Nov.	92	+12		
Dec.	95	+ 3		

As you see, when the underlying trend is *level* there is normally a 5% increase in unemployment from January to February. Thus, of the actual 15% increase from January to February, 5% was due to the seasonal factor. The balance was due to an underlying worsening of the situation by 10%.

From February to March, instead of declining 7%, as unemployment would have declined if trend had been level, the actual figure stood still. This means that underlying situation worsened by 7%. From March to April instead of declining 10% unemployment declined only 2%. This means that the underlying situation worsened by 8%.

Before any thought is given as to what the unemployment situation is, the seasonal factor must be taken into account. Otherwise the discussion is misleading—even worse.

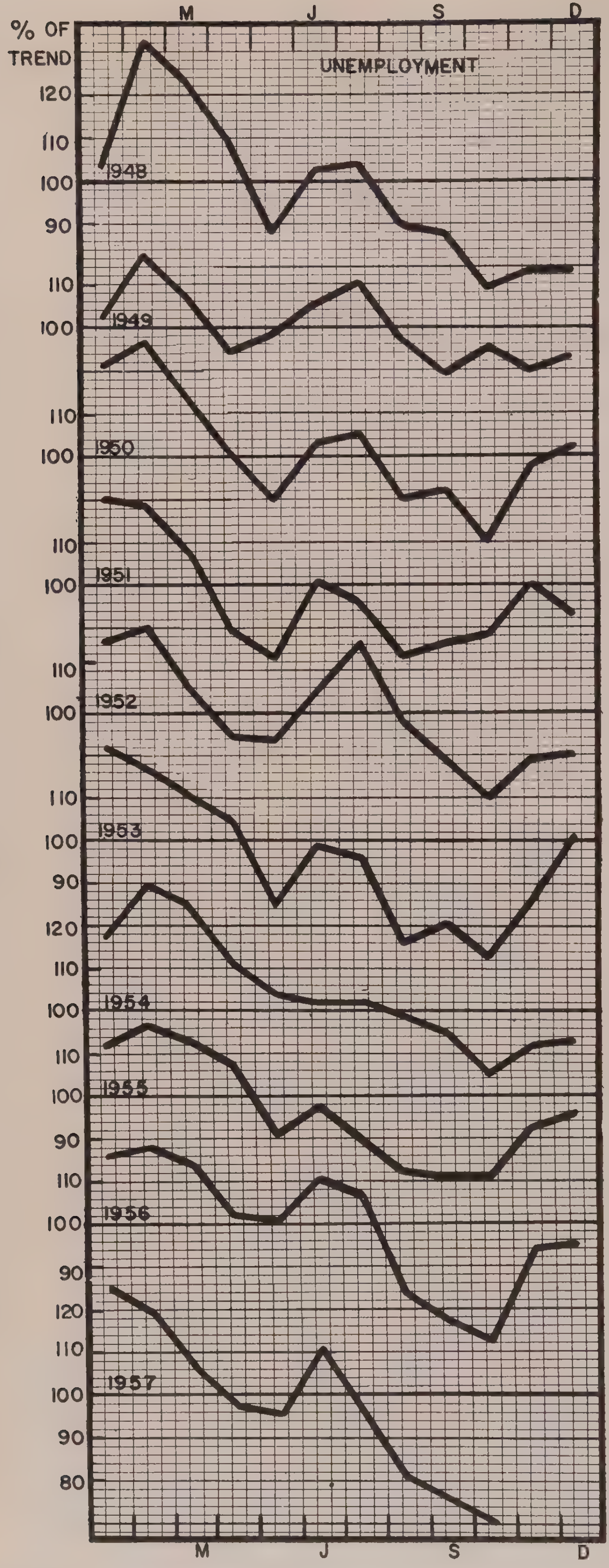


Fig. 2 Yearly Pattern of Unemployment, 1948-1957, By Months—Per Cent of Trend.

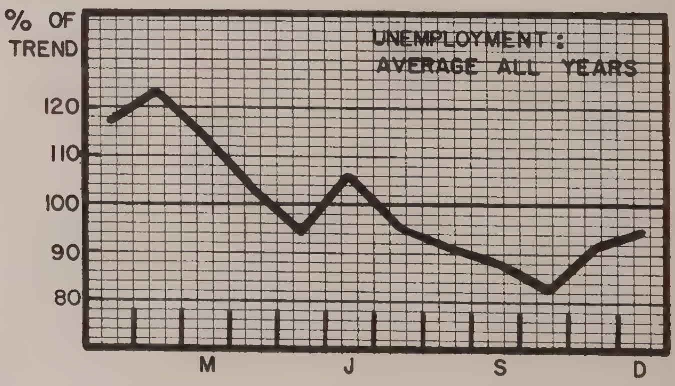


Fig. 3 Average Yearly Pattern of Unemployment—Per Cent of Trend. This is the Typical Seasonal Pattern.

Research by Others

THE 40,000-YEAR CYCLE IN WORLD TEMPERATURE

BY EDWARD HETTICH

A 40,000-year cycle in world temperatures was calculated by a Serbian physicist, Milutin Milankovitch. His theory, worked out in 1920, was offered as an explanation for the extensions and contractions of the great ice sheets which, in the past, have covered large areas of the face of the Earth. Its hypothesis was that the effect of the Sun's heat on the Earth was altered by changes in the Earth's orbit and axis of rotation.

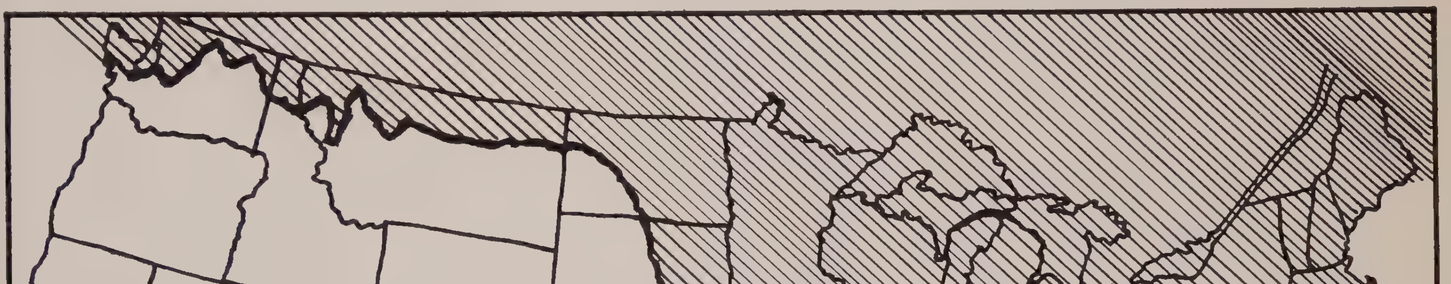
Temperature Changes Resulted

This caused long periods of hot summers followed by long periods of cool summers. In the latter times, lesser amounts of winter ice would melt away during the summer months and, over the years, the ice sheets would accumulate and extend. The reverse would be true in the hot periods. Milankovitch estimated that the time from one period of coolest summers to another was about 40,000 years.

This rhythmic cycle of 40,000 years now seems to be supported by the findings of a group of micropaleontologists (scanners of minute samples of fossils). Their study of world temperatures over millions of years was started by Dr. Harold C. Urey at the University of Chicago in 1947. Later, it was carried on under the direction of Dr. Cesare Emiliani who is now at the University of Miami.

Study Based on Temperatures of Seas

The searchers worked with fossilized samples drawn vertically from the oceans' floors in the form of cores. Each core contained a cross-section of an accumulation of skeletons of minute marine life—an accumulation which had piled up on the bottoms of the seas at an average rate of one inch in 1,000 years. Shells at the lower end of a 25-foot core could have drifted down to the sea floor about 300,000 years ago.



ABOVE MAP SHOWS COVERAGE OF THE UNITED STATES BY THE GREAT ICE SHEETS KNOWN AS THE CONTINENTAL GLACIERS. WE KNOW THEY HAVE EXTENDED AND RETREATED AT LEAST FOUR TIMES IN THE PAST. IF THE 40,000-YEAR CYCLE IS CONTINUED, THEY WILL COVER A SIMILAR PORTION OF OUR LAND ABOUT 22,000 YEARS FROM NOW.

Minute sections of each core were studied to determine the ratio of the oxygen isotopes in the shells of the fossils. For Dr. Urey and one of his collaborators, Samuel Epstein, had shown that this ratio reflected the temperature of the water in which the shell grew. By determining temperatures at various levels of the cores, a time-temperature relation was established. Analysis indicated: that sea temperatures had periodic high and low points; that these points were quite consistently the same even though the cores studied had been obtained thousands of miles from each other; and further, that the low points occurred at intervals of approximately 40,000 years. See chart below.

Ice to Spread Over Earth Again

Since the last low point occurred about 18,000 years ago, the next will happen about 22,000 years from now. And since the last low period corresponds to the time of greatest extensions of the glaciers in North America (See map on previous page), this 40,000-year cycle indicates that 10,000 years from now the glaciers again will start on their inexorable way, grinding everything before them to bits.

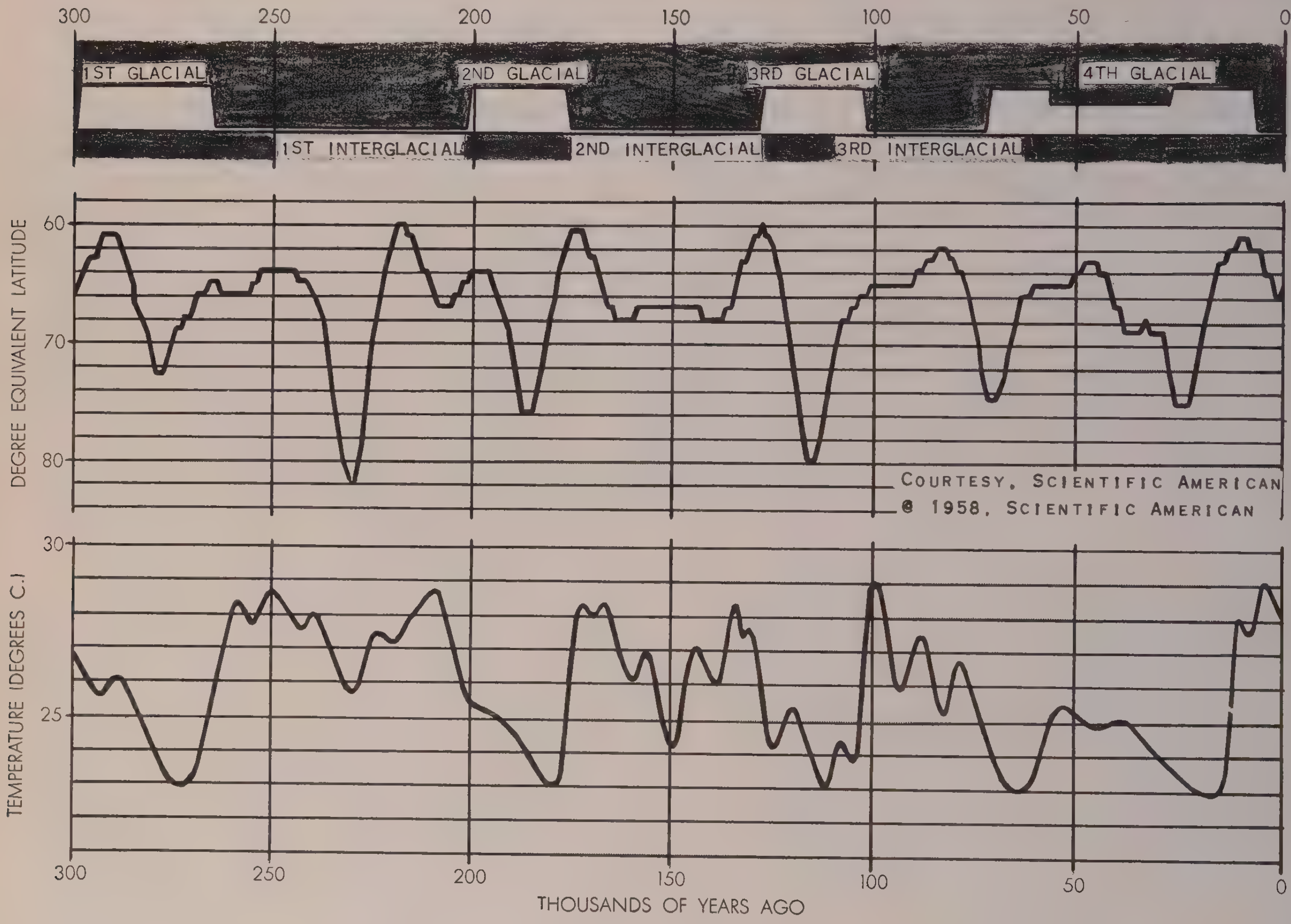
Although we shall not be here to check on the next low point of this cycle, nevertheless it is interesting to note an apparent confirmation of a previously discovered and expressed cycle.

Further Information Available

Further details of the workings and findings of the new isotope thermometer may be found in, "Ancient Temperatures" by Cesare Emiliani in Vol. 198, No. 2, p. 54 of *Scientific American*, February 1958. This tool also provides information about man's history, sea life, sediments on ocean floors, etc.

Other cycles, probably climatic in origin, have been mentioned in, "Cycles in the Advance and Recession of Glaciers" in Vol. 8, No. 9, p. 277 of *Cycles*, September 1957 and "The Effect of Climate on Human Behavior in History" in Vol. 2, No. 1, pp. 21-40 of *Cycles*, January 1951.

300,000-YEAR RECORD OF WORLD TEMPERATURE



Courtesy, Scientific American
© 1958, Scientific American

Composite curve from six deep-sea cores (bottom) shows the climatic fluctuations during the Glacial Epoch. The similar curve above it shows variations in summer solar radiation at latitude 65 degrees north, where the great ice sheets were centered. These are expressed as apparent shifts in latitude; thus 25,000 years ago latitude 65 received no more solar heat in summer than latitude 75 does today.

Excerpts from

SEASON OF BIRTH

ITS RELATION TO HUMAN ABILITIES

by

Ellsworth Huntington
Yale University

Published by John Wiley & Sons, Inc.
New York and London

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Foundation Reprint No. 31

This reprint outlines and summarizes the conclusions reached by Professor Huntington. The detailed back-up material supporting these conclusions can be obtained by reading the original and complete book.

FOUNDATION FOR THE STUDY OF CYCLES

SEASON OF BIRTH

BY ELLSWORTH HUNTINGTON

The season at which people are born has far greater importance than is generally supposed. At certain seasons the number of babies is unusually large, and the proportion of girls is high. The children born at those times have a low death rate in infancy, and the survivors live to more than the average age. In addition, the births of persons who achieve distinction rise to high proportions. Such conditions indicate not only that reproduction is stimulated at certain seasons, but that the children then born are more vigorous than those born at other times. There is also a little hint that mentally defective children are born in unusual numbers at this same time. Such children, however, as well as those that are malformed show a more decided tendency toward birth at the time of year when evidences of vigor are least numerous. At the most favorable season, however, criminals and persons who suffer from insanity and tuberculosis, as well as those who achieve eminence, show an unusual number of births. This, too, is an evidence that reproduction is especially stimulated at certain seasons. It apparently means that the unstable or weak types of parents . . . respond to the influence of the seasons more completely than do more stable or stronger types.

Best Season

The season when these seemingly contradictory, but really harmonious, conditions occur among the most advanced nations is the late winter or early spring—February or March. Its place in the calendar is apparently set by the fact that man is an animal. Like practically all animals he has a definite seasonal rhythm of reproduction. This rhythm appears to be an inheritance from a very ancient time, when relatively few children survived unless they were born at the best season. In our present sophisticated state children are born at all seasons, but on an average the ones born at the height of the old animal rhythm have an advantage over those born in its other phases . . .

The pioneer work of Lehmann and Pedersen (1907), and the fuller studies described by the author in *Civilization and Climate* (1915, 1924), indicated that the European races, at least, have two definite climatic optima, or sets of most favorable conditions. One optimum is physical, and its chief feature is an average temperature of 60° F. to 65° for day and night together. The other is mental and has been variously estimated as from 39° to 54°. In both cases humidity, variability of temperature, and other conditions such as sun-light play a part, but temperature is the dominant factor. Ever since these optima were discovered students have been greatly puzzled to know why a mean temperature of 60° to 65° F. rather than 70° or 50° to 55°, let us say, became established as the temperature at which man is best able to maintain a perfect balance between the production and loss of heat. Why should metabolism and the glandular functions proceed most perfectly at that particular temperature? A still more puzzling question has been: Why are there two optima of temperature? Why does not the brain function best at the same temperature as the other organs? . . .

The most surprising feature of the study of births described in this book is that it seems to provide an answer to all these questions. Not till most of the facts had been collected and the book was more than half written did I realize that the conditions governing season of birth among our primitive ancestry apparently explain the mental as well as the physical optimum of temperature. Our bodies apparently function best at the temperature which prevailed in primitive times at the mating season, for children conceived at that season were best able to survive. This gives us a physical optimum. Our minds function best at the temperature which prevailed in primitive times at the normal season of birth. At that time, more than any other, the survival of the new generation depended upon the alertness of the parents. Thus a mental optimum became established at a temperature lower than the physical optimum. Such in brief are the main conclusions to which we are led by the facts set forth in this book.

Patterns Repeat

It has long been known that the number of births varies from season to season, and that essentially the same variations repeat themselves from year to year. Sixty years ago an unnamed writer in a bulletin of the Department of Health in Michigan pointed out that this is presumably due to the weather or some other widely acting seasonal conditions, and not, as was often supposed, to the fact that marriages take place in great numbers in certain months. Since then we have gone a long way. Heape (1907) pointed out that in Cuba and elsewhere there is evidence of a distinct seasonal rhythm of births. Westermarch (1921) in his famous *History of Marriage* devotes an entire chapter to evidence of such a rhythm. He shows that it is especially strong among primitive people, and varies according to the climate, Ellis (1934) has amplified Westermarck's work . . .

In 1912, Gini put the matter upon a sound statistical basis by publishing a large number of tables showing that the seasonal distribution of births varies greatly from country to country and even from one decade to another in the same country. He also discussed the interesting hypothesis that eminent people tend to be born in unusual numbers from January to March. He noted, to be sure, that a similar tendency is widely spread among ordinary people in many nations, but he thought that the tendency was especially strong among people of the highest eminence. He found, for example, that among minor lights, such as modern Italian senators, the tendency to be born in the late winter or early spring is not so strong as among more famous people. Therefore he concluded that there may be some connection between birth in cold weather and eminence.

Various other writers have followed Gini's lead. In 1925, Alleyne Ireland found that in a list of 2650 eminent persons selected by himself 382 were born in February in contrast to only 149 during June. He concluded, however, that during most of the year the seasonal course of births among men of genius is about the same as among the population as a whole. Since births in February represent conceptions in May, he thought that the excess of eminent births in February merely shows that "May, when all nature renews itself, is the natural breeding-month."

Kassel (1929) criticizes Ireland, but on the basis of a much smaller, although more carefully selected, list of eminent people he makes some rather sweeping suggestions. "For genius as a whole there are no favorite birth months, since the genius of the world seeks much the same month for the beginning of life as the ordinary population." He says, however, that the favorite month of birth for American and French genius is January; for German genius, December; for English, October; and for Italian, March. He even goes so far as to suggest that famous clergymen, poets, and scientists tend to be born in the half of the year from July onward, while philosophers, statesmen, and soldiers tend to be born in the other half. He recognizes, however, that, since his data pertain to only 431 persons all told, they cannot be very conclusive.

Work of Pintner

Pintner (1933) has thrown further light on this problem. When he uses the same data as Gini and Kassel, namely, a list of the world's most famous people, he finds, as they do, that eminent people show a strong tendency to be born in January, February, or March. He gets a similar result from the 1300 or more scientists who are starred in *American Men of Science* because their colleagues consider them leaders. Using all of the 9000 scientists in that book, however, he finds that, although the first quarter of the year has more than the average number of births, it does not have so many proportionally as does the early fall. He found a similar seasonal distribution of births on tabulating 12,000 people in *Who's Who in America*. Desiring to test the matter in another way, Pintner tabulated the intelligence quotients of thousands of school children in or near New York. He found that on an average the children born in May and June, and also in September and October, have a slightly higher I. Q. than those born at other seasons. Among the 17,000 children whom he investigated the average intelligence quotient was lowest among those born in January and February. This is quite contrary to what one would expect from the seasonal distribution of the births of people of great eminence. It is not contrary, however, to what we should expect when defective and inadequate groups as well as gifted groups are taken into account.

Defectives

The study of the season of birth of defectives has hitherto led to equally contradictory conclusions. Petersen (1934, 1935, 1936) presents data which seem to show that the births of physical defectives vary from season to season in about the same way as those of persons of unusual ability, the maximum of conceptions occurring in April, and of births in January. The conception of feebleminded persons, he says (1935), follows quite an opposite course, with a minimum in April and a maximum in October. He also concludes that the births of sufferers from schizophrenic insanity (dementia praecox) follow the same seasonal course as those of intellectual leaders. Nevertheless, sufferers from manic-depressive insanity show a different seasonal distribution of births with a maximum of conceptions in midsummer. Murphy (1936), from a comparison of defectives with their brothers and sisters, comes to the opposite conclusion—namely, that the season of birth has no relation to physical defects. Other investigators have also discussed the problem of the season of birth of defectives, but the statistical basis of all the studies except those of Gini and Pintner has been small.

Weather and Death

Another phase of the problem is equally puzzling. The seasonal distribution of births varies not only from country to country, but also from decade to decade in the same country. In this respect births are like deaths, but there is one essential difference. In every country in the world, so far as I have been able to discover, the deaths fluctuate in harmony with the weather. Cold weather, especially if it is very dry, is always accompanied or soon followed by a rise in the death rate. Very hot weather, especially if it is humid, is accompanied by a similar but more sudden increase in deaths. Besson (1935) has shown that in Paris one can estimate the number of deaths with considerable accuracy merely from a knowledge of the weather. In the United States a weekly bulletin published by the Census Bureau gives a most illuminating curve showing the mortality in all cities of over 100,000 population. Spells of extremely hot or cold weather are invariably registered in the curve. In July, 1936, two weeks of unusual heat, especially in the central part of the country, sent the death rate skyrocketing to about 50 per cent above the normal. On the other hand, unusually warm weather in January, 1932, and again in January, 1934, took a bite out of the middle of the annual upward bulge in the mortality curve so that there were depressions in place of the usual peaks.

With births the case is somewhat different. In many countries they fluctuate in almost exactly the reverse fashion from deaths. Seasons of many deaths are seasons of few births; births increase as deaths diminish. Japan affords an extreme example of this, as I have shown in *Civilization and Climate* (1924). The population of that country is increasing with alarming rapidity. Nevertheless, during the summer the conceptions that lead to live births decline so much that in September, when they are at a minimum and deaths at a maximum, the conceptions are less numerous than the deaths. If such conditions prevailed permanently, the Japanese population would decline, instead of increasing by three quarters of a million or more per year. In many other countries, as I have shown elsewhere (1932, 1935), the conceptions and deaths follow opposite courses throughout the year. The work of Mills (1930, 1934) confirms the conclusion that such opposition is the rule in many countries. He lays special stress upon the small number of conceptions in hot weather, but cold weather also is associated with relatively lessened rates of reproduction.

In addition to all this, however, there are periods in most countries when the conceptions and deaths fail to fluctuate in opposite fashion. The deaths obediently follow the weather, except when there is some catastrophe such as famine or pertilence. The births, on the contrary, may follow the weather part of the year, but at other seasons they pursue their own course. . .

Factors of Fluctuations

The study described in this book examines millions of births in order to discover the reasons for their seasonal fluctuations and the degree to which the births at different seasons vary in quality. The first phase of the problem deals with factors which influence seasonal fluctuations in the number of births, regardless of the quality. One type of factors is purely cultural, and depends upon habits which have grown up in diverse parts of the world. Another type is climatic, and depends upon the weather. The season which happens to be the favorite for marriages is often cited as one of the most important cultural factors, but it has far less importance than is usually supposed. Religious fasts and festivals, on the contrary, have a pronounced effect upon the birth rate in some countries, and comparatively little in others. The demands of certain occupations upon people's energy may also play a part in causing the number of conceptions to vary from season to season. The greatest effect of all, so far as cultural factors are concerned, is produced by seasonal migrations whereby the men tend to be away from home during part of the year. The return home of the absentees in winter, especially at Christmas, is a persistent cause of a definite seasonal fluctuation in births. Yet in certain countries, and at certain epochs in other countries, the peak of births due to the midwinter holidays disappears entirely. . .

In this last respect the seasonal fluctuations arising from the weather are unlike those associated with cultural conditions. In hundreds of seasonal curves of births which were studied in preparing this book a peak of some sort is associated with the late winter or early spring, provided the winter is cool. The peak is sometimes smaller than peaks associated with certain cultural factors, but it is always present. Moreover, it always bears essentially the same relation to the weather, for it is the result of conceptions at the time when the weather is most nearly ideal. "In the spring a young man's fancy lightly turns to thoughts of love" for very good reasons. Man is an animal, as we constantly discover, and as we refuse with equal constancy to believe. Like all other higher animals, he has a definite seasonal rhythm of reproduction which makes it best for babies to be born in the late winter or early spring.

Survival Pattern

The facts set forth in later pages suggest that man acquired this fundamental animal rhythm because it favored the survival of the young. Let us adopt for the moment the widely accepted hypothesis that early man acquired his distinctive human characteristics in a climate that was warm, but not tropical. In such a climate the winter is short and cool, but not cold, and the summer fairly warm. Babies suffer relatively little from a moderately low temperature, but very greatly from high temperatures. Hence a primitive child born in March, let us say, has two advantages over a child born at other seasons, and especially over those born from June to September. First, its mother's ability to feed it will steadily increase for seven months or so in harmony with the growing demands of the child. The reason for this is that, except in recent decades and among the most advanced nations, the food supply during the winter has been poor in both quantity and quality, but begins to improve in the early spring. From that time onward the food becomes better until autumn, when grains, fruits, nuts, and fat animals are readily available. Thus by the time the March child of our early ancestors began to need much milk, its mother was beginning to be well fed . . . the abundant food later in the season enabled its mother to feed it more and more bountifully in harmony with its growing needs . . .

Seasonal Disease Pattern

The other main advantage of being born in February or March depends on the seasonal distribution of diseases. Before the advent of modern hygiene the death rate among infants had two peaks, one in winter, one in summer. In climates like that of New York the winter peak was of minor proportions. In climates with warm winters it practically disappeared, but in western Europe it was very prominent. The summer peak, which culminated in August or September, was truly appalling in regions such as much of the United States, where the summers are long and hot. It was due mainly to digestive disturbances, for children are born with a weak alimentary apparatus. The child born in February or March has the maximum chance of survival through the hot weather. Under normal, primitive conditions, it is still living on its mother's milk when the heat arrives, so that the great dangers from contaminated food are minimized. Moreover, it has lived long enough so that its digestive system is beginning to become stabilized and is by no means so easily disturbed as it was during the earliest months. Thus the child born at about the time when vegetation first begins to revive in the spring appears to have the best chance of survival. This may not be of much importance today with our modern methods of sanitation and diet, but it must have been of immense importance throughout most of man's long history. Therefore it is not surprising we find evidence of at least a minor peak in the birth rate during the winter or early spring. Only in steadily warm regions, or in those in such high latitudes that the summers have no hot weather, do we find exceptions. The exceptions prove the rule, for they accentuate the importance of certain kinds of weather . . .

Optimum Temperature

This basic annual rhythm, which we may also call the physiological or animal rhythm, seems to offer an explanation of why the optimum temperature for health and efficiency varies so little from country to country, or race to race. People have the best health and greatest physical vigor when the mean temperature for day and night together averages from 60° to 70°F. (15.6°-21.2°C.). This seems to be equally true of races as diverse as the Finns of the far north and the Javanese close to the equator. Therefore it seems like a primitive trait acquired in the early stages of the existence of our species, and modified only a little by the diverse environments in which the various races of mankind have since lived. How slight the modification is may be judged from the fact that factory workers of west European descent in the northeastern United States work most effectively when the temperature averages 60° F., whereas the Cubans in the cigar factories of Florida work most rapidly at a mean temperature of 70° or less. Again, although the Javanese are a thoroughly equatorial people, they have the best health and greatest energy when they live at such an altitude that the temperature averages 70° or lower instead of 80° as is the case where most of them live. In a general way we may say that a mean temperature of about 63° for day and night together is the optimum for physical well-being in man, and that the optimum rarely if ever falls below 60° or rises above 70° even among people who live in the coldest or hottest parts of the world. There may be exceptions, for the matter has not been studied among such people as the Eskimos of the far north and the Dinkas of the hot upper Nile in Sudan. There is, however, no question as to the small range of the optimum temperature among diverse races in contrast to the great range in the mean temperature of the regions where they live.

This brings us to the interesting problem of why the human optimum happens to lie between the temperatures of 60° and 70° F. and why it varies so little from one climate to another. The usual answer is that the optimum temperature is the one at which there is the best balance between the cooling action of the air, and the warming action due to the combustion of food within our bodies. This is doubtless true, but for other animals which have essentially the same internal temperature as man the optimum external temperature appears to be quite different. We cannot quote chapter and verse for this, but it must be true because many animals thrive only in regions where the optimum human temperatures are never experienced . . .

Optimum and Health

Without further discussion, then, we may point out what seems to be the reason why the optimum temperature for human health occurs when the temperature for night and day together averages between 60° and 70° F. In preparing this book the seasonal distribution of births has been studied in more than 80 regions. In every one of these a major or minor maximum of births occurs when the mean temperature averages somewhere between 56° and 71° F. The median temperature at which this occurs is 62° F. In cool regions the rise toward this temperature appears to be especially effective in stimulating reproduction; but in hot regions the drop to 62° is more effective. This reproductive optimum is practically the same as the 63° which appears to be the average physical optimum on the basis of records of daily work and mortality. Such an agreement suggests that the optimum temperature for physical health was originally fixed by the selective action of the climate in which *Homo sapiens* became established as a distinct species. If parents were stimulated to reproduction by the temperature which happened to prevail 9 months before the most favorable season for the birth of children, their offspring would have the best chance to survive. Thus for generation after generation there presumably occurred a selection in favor of persons who inherited a tendency to have especially good health when the mean temperature rose to 60° or 70° in the spring.

The same hypothesis which best fits the physical optimum also fits the mental optimum. At the time of conception the best thing that parents can possibly do for their children is to be in perfect health. When a primitive child is born, however, the best thing the parents can do to insure its survival is to be as alert as possible. In other words, survival is best promoted if parents are physically at their best when their children are conceived and mentally at their best when the children are born. This, apparently, is the reason for two distinct optima of temperature . . .

If we are right about the optima, the human species presumably acquired its present physical adaptation to the weather under certain definite conditions of climate. These conditions appear to have been such that infants which were conceived when the temperature rose to 60° or 70° in the spring were born at the time most favorable for their survival. At that time the temperature averaged about 15^0 lower than at the time of conception. Hence the primitive parents whose physical vitality was especially stimulated by the higher temperature and whose mental activity was especially stimulated by the lower temperature were the ones whose progeny was most likely to survive. Their response to the weather became hereditary throughout the species by reason of natural selection. The final conclusion, then, is that on an average people feel most comfortable and vigorous with a noonday temperature of 70^0 or a little higher and a mean temperature of about 63^0 for day and night together because it is best that children should be born in the late winter or early spring. June has been rightly chosen as a favorite month for weddings. Nevertheless, our mental activity is greatest in the spring and fall when the temperature averages about 47^0 because that is the temperature at which it was best for our primitive ancestors to be born.

Seasonal Differences

The differences between the children born at one season and another extend into many fields. A statistical study of the varying proportions of the two sexes at birth sounds like a dry subject. But statistics may be juicy. They seem, for example, to give the lie to the oft-repeated statement that girls possess more vitality than boys. According to the biologists all human being have 24 pairs of chromosomes. In 23 of these the members of each pair are alike, but among males the 24th pair consists of a so-called Y chromosome matched with an X chromosome, whereas in females both are of the X type. The relations of the X and Y chromosomes are such that the numbers of the two sexes in any large population should be equal at birth, unless some special circumstance favors one sex more than the other. Normally, however, about 105 boys are born for every 100 girls. Among stillbirths the proportion of males is often 125 for every 100 females, and among abortions at earlier stages of pregnancy it rises to 300 or 400. It is evident, then, that a great many potential females fail to materialize at all, or else perish very early. Some biologists explain the unequal numbers of the two sexes by assuming the existence of a special lethal form of certain genes which may occur in double doses in embryos that would otherwise become females, but is always neutralized by a stronger form in males. Hence a certain proportion of potential females never develop into embryos, and girls are less numerous than boys. Other biologists hold that the spermatozoa which contain X chromosomes and thus produce females are less vigorous than those having a Y chromosome, which produce males. Hence they have more difficulty in reaching the ova, and girls are correspondingly scarce.

Our investigations agree with this second explanation, but not the first. They also indicate that when people are in the right physical condition the two kinds of spermatozoa are of nearly equal vigor. At the most favorable season of the year the two sexes are born more nearly in equal numbers than at any other season. Where the contrast in vigor from season to season is slight, as in Sweden, the contrast in the number of the two sexes is also slight. In Japan, on the contrary, where the contrast is great, girls may be as numerous as boys among children conceived in May or June at the end of the extremely delightful spring, but among those conceived in September at the end of the long, hot, humid season, there is an astonishing preponderance of boys. In view of all the available facts it seems probable that the numbers of the two sexes would be equal if the environment conditions were perfect and if parents enjoyed perfect health.

Longer Life

If such perfect conditions should prevail, what difference would it make in the lives of the children? In the first place, they would presumably live long on an average. At any rate, among the people who are now born at the most favorable season the average duration of life is several years longer than among those born at the least favorable season. This is true even in comparatively good climates like that of the northern United States. It is probably true to a still greater degree in countries like Japan . . .

Longevity Factors

Length of life is of course dependent upon many factors beside the season at which one is born. Pearl (1934) has shown that long life is hereditary . . . Mode of life also has a great influence upon how long people live . . . Accidents, too, and such conditions as famines and pestilences shorten many lives. And the people in hot, humid climates die earlier than similar people in climates such as those of New Zealand, Belgium, and the state of Washington. But all this does not alter the fact that in the past, in New England for example, the people born in March, and attaining at least the age of 2 years, have lived on an average nearly 4 years longer than similar people born in July. Length of life depends upon the combined effect of many causes; the investigations here described show that season of birth must be added to the causes already known.

Season of Genius

The data in this book support the idea that season of birth bears a close relation to genius and eminence. Unusually high ability is probably never the result of accidents. Accidents tend almost inevitably to injure rather than improve the delicate mechanism of the brain. Genius apparently arises from a fortunate combination of the genes within the chromosomes at the time of conception. In order to reach fruition it needs an environment sufficiently favorable to give the innate capacities full chance for expression. The facts set forth in this book indicate that the births of persons of unusual genius conform to the animal rhythm and to the temperature much more closely than do births in general. This is just what would be expected on the basis of what we have seen as to sex and length of life. The high percentage of girls and the long lives which are associated with birth at the most favorable season are indications of vigor. Unusual achievements are a similar indication. The fact that the births of persons of high distinction show more than the normal tendency to conform to the basic animal rhythm of the seasons merely shows that the weather helps the genes. One may surmise that people possessing an unusually favorable combination of genes are especially susceptible to outside influences. Hence even at the inception of life they are helped by the same seasonal conditions which increase the proportion of girls and increase the length of life. One may also surmise that throughout life people's health and mental vigor are influenced by the condition of the spermatozoa and ova at the time of conception. Perfect reproductive cells can be produced only when the health of the parents is perfect. An approach to such health is possible only under favorable conditions of many sorts, including mode of life, diet, and weather.

The births of people of uncommon ability show a tendency not only to follow the animal rhythm to an unusual degree, but to occur in weather somewhat cooler than that in which births are usually most numerous. This is especially interesting because studies which I have described in *Civilization and Climate* (1915, 1924) and later publications (1933) indicate that the optimum temperature for mental activity is lower than for physical. Low, but not excessively low, temperature has in some way become associated with mental activity. The scientific tendencies of the Swedes, and the philosophical tendencies of the Scotch, illustrate the matter. The innate quality of any given group and the accidental combinations of genes which produce genius are presumably the most important elements in the matter. Nevertheless, the fact that in our study of births we find a relationship between low temperature and intellectual activity may be highly significant. It leads us to suspect that cultural inventions which render people comfortable in cooler and more invigorating parts of the world have not only enabled civilization to move northwestward from ancient Egypt and Babylonia, but have thereby led to a higher level of mental activity among people as a whole. Not only have health and activity been promoted, but people have been born with greater vigor and with a higher percentage of potential leaders . . .

Turning now to defectives and weaklings of various kinds, we shall find in later chapters that the season of birth does not present so clear a picture among physical and mental defectives as among persons of eminence. There is some evidence that the inmates of homes for the feeble-minded tend to be conceived to an unusual degree in hot weather. This is what might be expected from the fact that persons of great achievement tend to be conceived in weather cooler than the physical optimum. It is not surprising that the facts in this respect are not clear. The defects which make people feeble-minded are partly innate and partly due to accidents or other environmental conditions which may occur at any time from conception onward. Even if the season of conception does have some relation to defects, its influence may not be evident among great numbers of defectives the majority of whom owe their defects to accidents . . .

Season of Defectives

Criminals, insane persons, and sufferers from tuberculosis show a well-defined seasonal distribution of births which seems at first to contradict our conclusions as to men of genius. Among all these weaker types the basic animal rhythm of births is more strongly evident than among people in general. This agrees with Pintner's discovery that the intelligence quotient is low among people born in January and February. His data indicate that the number of births and the average intelligence quotient vary in opposite directions. A high average I. Q. accompanies a low birth rate. The new data given in this book show that when births are numerous not only is the average I. Q. low, but also the proportion of persons who will become criminals, or suffer from insanity, or tuberculosis, is high. The fact that this occurs at the season when the births of eminent leaders are most numerous furnishes strong, though unexpected, evidence as to the potency of the basic animal rhythm of reproduction. It apparently indicates that when the reproductive urge reaches its height in May or June two things occur. First, on the average the children who are then conceived are stronger and longer-lived than their brothers and sisters who are conceived at other seasons. This explains the high proportion of births of geniuses, or rather of persons whose innate ability finds expression in activities which lead to fame. True geniuses may be equally numerous at other seasons. Second, people who are emotionally or intellectually weak are especially likely to yield to the sexual stimulation which marks the chief season of reproduction. Such parents presumably are responsible for a large percentage of the persons who become criminals or suffer from insanity. Third, physically weak people who usually are not able to produce children may become parents under the stimulus of the primitive breeding season. Their children are probably especially susceptible to tuberculosis as well as to the influences which lead to crime and insanity. In this connection we shall find it especially interesting to note that outbreaks of insanity, as well as of suicide and sexual crimes, follow the seasonal rhythm of conceptions with extraordinary fidelity. Man, like the animals, is subject to a breeding season which is accompanied by heightened emotional instability. When effects like these are added to the well-known seasonal and regional variations in health, diet, and occupations, it becomes evident that weather and climate influence human welfare to an extraordinary degree.

Letters to the Editor

WHAT'S AHEAD FOR WAR?

Editor's Note: We received requests for hundreds of copies of the February 1958 issue of *Cycles* which contained the story "What's Ahead for War?" For a review of that story see page 174 in the Cycle Roundup section of this issue.

* * * *

Dear Mr. Dewey:

Please have two copies mailed to me, which I will send under a personal cover to the two Senators from this state.

You stated that you have a geiger counter on order. But as this only reads to .02 roentgens, you will also need a radiological survey meter of Civil Defense design, which reads from .02 R to 1000 R.

Also, secure from the Superintendent of Documents a copy of "The Effects of Nuclear Weapons," June, 1957, price $2.00 paperbound; and Civil Defense Technical Bulletin TB 11-31, "Probability of Fallout Debris Disposition", June, 1957, price approximately 35 cents. From Chart #35 in the latter you will note that you are close to the 70% area, which is a serious place to be when the bomb falls on Pittsburgh—unless you have an underground shelter equipped with an A.E.C. air filter, a light plant to drive it, and a water supply or well within the shelter.

Yours very truly,
R. W. W.

Grapeview, Washington

1960 STOCK MARKET LOW

Dear Mr. Dewey:

I have enjoyed reading your publication *Cycles*. Your stock market graph shows 1960 to be the low mark before positive forces begin to show an uptrend toward a new boom.

I may be out of order in expecting you to answer this question, but as I have investments in the market I should like to ask if this information in your judgment may be followed as a guide in market investments for the next few years?

If you feel that the evidence charted is sufficiently reliable about 1960 being the bottom, the information can be very valuable, even though this is not the prime purpose of your studies.

Sincerely yours,
Carlton Palmer

Atlanta, Georgia

In Reply:

Dear Mr. Palmer:

The other day I had occasion to investigate a man who lives in a neighboring town. I went to the town and talked with the hardware merchant, the real estate agent, three men on a road gang working near the man's house, the owner of the service station who lived two doors away from the man, and of another service station in the center of the village. I gathered facts from each of these people. I then put all these facts together and came up with an opinion.

Note that I did not rely on any one particular kind of fact. I got an assortment of facts and put them all together.

You must do the same in trying to outguess the stock market. The synthesis of the 11 cycles and trend is only one fact.

In this connection remember that none of the cycles used in the synthesis is shorter than 4 years. It is hard to pinpoint anything with so crude a tool. Another fact to take into account is that of the 17 bear markets that we observe with annual figures, only 2 have lasted uninterruptedly as long as 4 years. Another fact to take into account is that Dunbar's 46-month cycle calls for a high in 1960. And then there are scores of non-cyclic facts to take into account too.

I say all of these things, not to invalidate the significance of the cycle facts, but to suggest that they need to be used with caution and in connection with other facts. As far as the 11 cycles are concerned, however, they do definitely suggest caution for the next two or three years.

I hope this clarifies the situation somewhat for you. If not please write me again.

Ever cordially yours,
Director

ANOTHER READER WRITES

You miss entirely the psychological problem—*what makes people do things?* Even after 100% prediction they won't use it right.

Why? Because your communication

is verbal
clouded
wordy — more than pictured
simplified
humanized

Probabilities for the eye are better than possibilities for the brain.

P. R.

Los Angeles, California

ROCK STRATA

Dear Mr. Dewey:

Anent the remarks on "thickness and thinness of rock strata", I was reminded by and of the enclosed clipping from the magazine *Realities*, February 1957, taken from an article on New Zealand.

Editor's Note - See the picture on the next page.

Here are regular cyclic stratifications indeed, and what interesting facts are locked in them. Can they can be analysed by the "dying radium" method?

Are there any articles about this aspect of our study?

Sincerely
Harold S. Belcher, M.D.

New York, New York

In Reply

Dear Dr. Belcher:

I do not know whether these deposits have enough carbon to enable them to be dated by the "dying radium" method. However, their thicknesses could be measured, and they could be studied from the standpoint of cycles.

We have a number of articles in our library about the thickness and thinness of rock strata. Some of these have been digested and published, others will be as soon as possible.

Ever cordially yours,
Director

CYCLES

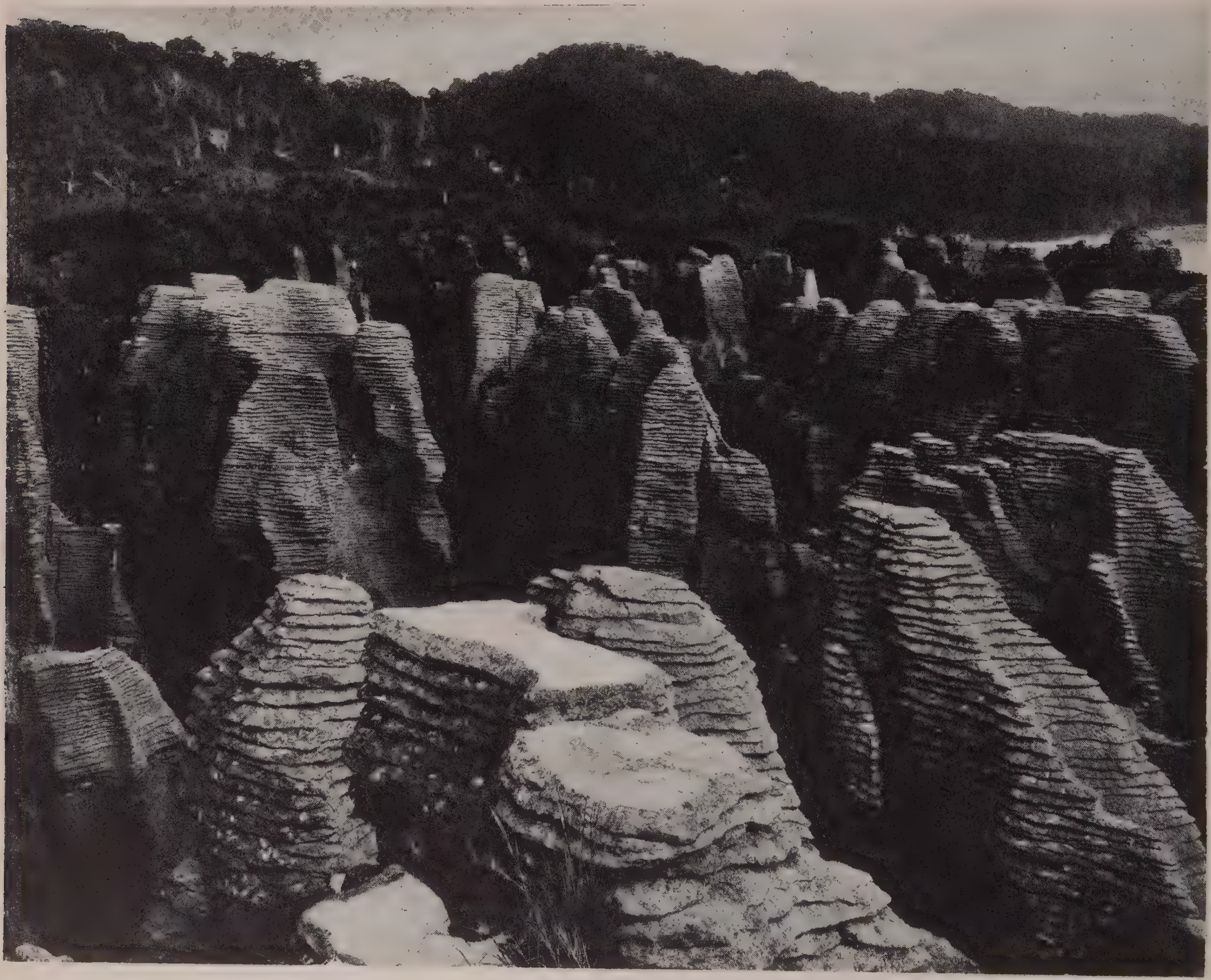
Dear Mr. Dewey:

. . . In my work as a management engineer I have found many cases where cyclical phenomena can be put to practical use. One such was the use of cycles in forecasting native labor wastage in gold mines in (*South Africa*). By this forecast it was possible to pass on to recruiting stations labor needs well in advance . . .

Another instance was an application in an iron and steel foundry. Here a regular 11-month cycle was found in orders for gray iron castings. From this the need for moulders could be forecast and thus a stable labor force was established among the moulders who were shifted back and forth gradually from the steel casting section to the gray iron section . . .

Yours Sincerely,
F. S. M.

St. Helens, Oregon



Rock Strata at South Island, New Zealand. Photograph courtesy Realities Magazine.

Chapter Affairs

SAN FRANCISCO

The first meeting of the San Francisco chapter was held May 21st as scheduled. Thirty-three people attended and one member reports, "…….the interest was very good."

A resolution to form a chapter was passed and the by-laws under which the chapter will function are now being written.

Any members in the San Francisco area who missed the first meeting but are interested in attending the next meeting should contact Mr. Harvey Hanson, 1721 Brush Street, Oakland 12.

WASHINGTON, D.C.

Members in the Washington, D.C. area have formed a pre-organization committee to start a local chapter. The committee is working under Col. Ralph C. Benner and Mr. Vickers.

The present plan is to hold a meeting of local members at Community Room, Washington Post, on L Street, N.W. The meeting is currently scheduled for Friday, June 20, 1958.

Members who live in the Washington area will receive notices about the meeting from the committee.

NEW YORK

April Meeting

The New York Chapter of the Foundation held its regular monthly dinner meeting on Tuesday, April 15

Following an abbreviated business meeting, we heard a special guest speaker, Dr. Sherwin A. Kaufman, Medical Director of Planned Parenthood of Manhattan and the Bronx.

Dr. Kaufman is an obstetrician and gynecologist with offices in New York City. He is presently an Associate Attending in Obstetrics and Gynecology at the Beth Israel Hospital in New York City. He is on the staffs of both Mt. Sinai Hospital and Doctors Hospital, also in the City. Dr. Kaufman is a fellow of the American College of Surgeons.

Dr. Kaufman spoke on "Biological Rhythm in Human Fertility".

We shall mention only a few highlights of Dr. Kaufman's exceptionally informative talk. He discussed principally the many cycles in human reproduction. A few of the mentioned cycles: 1) Amorousness in men, 2) amorousness in women, 3) frequency of coition, 4) the menses, 5) pre-menstrual tension, 6) ovulation, 7) fertility, 8) the period of gestation, 9) basal temperature in women, 10) Fallopian tube contractions, 11) foetal movements, 12) foetal heartbeats, etc.

An extended question and answer period followed Dr. Kaufman's address.

May Meeting

The May meeting of the New York Chapter was held May 20 at the White Turkey Sutton Place. Following dinner a talk was given by Mr. E. S. C. Coppock, a well-known investment adviser of San Antonio, Texas. His subject was "Cycles and Profits".

The meeting was described as "a thrilling experience".

Plans For The June Meeting

The Chapter's June meeting will be held on Tuesday, June 17, beginning at 5:30 P.M. in the White Turkey Town House, 260 Madison Avenue (between 38th and 39th Streets), New York City.

The guest speaker will be Mr. E. R. Dewey, Director of the Foundation for the Study of Cycles.

He will discuss cycles in war and also the Foundation's recent work in short-term cycles in the stock market. A question and answer period will follow.

Invitation To Join Chapter

The New York Chapter once again invites all members of the Foundation in the New York area to join the Chapter's activities.

Requirements for Chapter Membership are:

1. Membership in good standing in the Foundation.
2. Interest in rhythmic cycles (any variety!)
3. Payment of $5.00 annual Chapter dues.

Why not attend the next monthly dinner meeting, after which you can better decide whether you care to join. In case you have already decided in favor of joining, just mail your check for $5.00 covering 1958 dues, to our Chapter Treasurer, Paul H. Halladin, 24 Oakview Avenue, Maplewood, New Jersey.

Jack A. Dorland

Foundation Affairs

FINANCIAL REPORT FOR 1957

The financial picture for 1957 shows considerable improvement. Here are the figures of income and expense:

Membership Dues			
From old members	$28,804.09		
From new members	49,954.35		
Total Dues		$78,758.44	
Less Costs			
Old members	28,034.43		
Direct mail	46,930.37		
Total		74,964.80	
Gains from membership			$ 3,793.64
Contributions and Research			
Contributions Received		7,108.50	
Cost of Research		5,827.29	
Reserve			1,281.21
Other Income - Net			
Lists			4,383.38
Advertising			300.00
Sales of Publications			1,123.81
Correspondence Course			517.24
Research for Others			1,266.28
Miscellaneous (loss)			(879.26)
Net Gain for the Year			$11,786.30

Comparison With 1956

First, in 1957, instead of losing $6,804 on the Membership Division, as in 1956, we made $3,793. Second, contributions were up from $5,457 to $7,108. Third, miscellaneous income was up from $5,674 to $6,711. Our net gain for the year was up from $1,114 to $11,786.

The Membership Division

There are several reasons for the improvement in the Membership Division picture.

First, we were able to reduce the cost of inviting new members from 12.0¢ a letter in 1956 to 10.2¢ a letter in 1957.

Second, we got a better response to our letters. In 1956 the response was 9.18 per thousand invitations; in 1957, 9.78.

In 1956 we put 2,937 new members on our books; 4,501 in 1957.

The result of these facts is that each new member cost only $10.43 to put on the books instead of $13.12 as in 1956 (both figures include all overhead).

Third, the average cost of servicing members was down from $4.54 for 1956 to $4.18 in 1957.

Our membership increased from 5,576 on Jan. 1 to 6,893 on Dec. 31; the average number for the year being 6,707. Our renewal rate increased from 33.0% for 1956 to 53.8% for 1957.

All these figures are quite satisfactory except the renewal rate. The bad renewal rate is my fault for not producing more interesting and/or more useful reports.

Contributions

An analysis of contributions in 1957 shows the following breakdown:

Size of Contribution	Number of Contributors	Amount Received
$1.00	3	$ 3.00
2.00	15	30.00
2.50	1	2.50
3.00	4	12.00
5.00	387	1940.00
6.00	53	318.00
7.00	7	49.00
8.00	2	16.00
10.00	195	1950.00
12.00	3	36.00
15.00	84	1260.00
16.00	2	32.00
20.00	6	120.00
26.00	1	26.00
37.00	2	74.00
40.00	14	560.00
50.00	1	50.00
90.00	5	450.00
180.00	1	180.00
Total	786	$7,108.50

It is interesting to note that of this total $247 came from foreign countries.

Miscellaneous

We make a rather good thing of selling names of former members to other people who wish to solicit them for this and that. Our names pull very well and people buy them again and again. The persons who want our names supply their own envelopes and we address them from our discard addressograph plates at $20.00 a thousand. Do you want to buy some good names?

Our back cover is for sale at $150 an issue. Want it? (Ads of financial services not acceptable.)

Sale of the *Journal of Cycle Research* (at $4.00 a year) and back copies of *Cycles* (at $1.00) provides a small but steady income.

We are now making money on the correspondence course texts, but, even so, the sale price is not all clear profit. We still have mimeographing and collating to do; and as soon as we can, we plan to issue some free supplements, too.

Research done for others could be very profitable, but most research done this way is buried, and we don't feel it fair to our members or to our basic purposes to divert energy in this direction.

As for administration, I went without salary again in 1957, but we are now far enough ahead so that I hope to be able to get some in 1958.

E. R. D.

The Cycle Round-up

JULY 1958

The purpose of the Cycle Round-Up is to follow "how it came out" for any and all of the series we have analysed and reported on in *Cycles*.

If we have worked with a series of figures which can be brought up to date only once a year the item can be carried in this section only once a year.

This does not create any problem.

However, there are monthly figures available for many of the series we work with.

This is true even of series on which the work was done with annual figures.

The work on corn prices, bond yields, wheat prices, and stock prices, for instance, was all done with annual averages. The cycles involved are long cycles, and it was not necessary to use monthly data.

But we follow the performance of the data with respect to the current phase of a given cycle (of combination of cycles) with monthly figures.

Following annual cycles with monthly figures does create the problem of maintaining perspective.

A 5-year cycle has a down-leg of 2 1/2 years and an up-leg of 2 1/2 years. If you plot monthly figures against a 2 1/2-year sweep of the cycle, obviously the figures are going to bounce around. It may be difficult at times to decide if the cycle is continuing to work.

It is necessary to view any current monthly figure as part of an annual average moving slowly up or down or sideways.

This month we review recent aluminum production and use a chart showing monthly figures compared to a 6.4-year wave. To keep perspective, however, a yearly chart showing the performance of the cycle over a long period is also presented.

From our point of view the yearly chart is more important, but certainly the monthly chart is of more current interest.

This month we also review stock prices with respect to the past performance of the 11 cycles we have isolated in this series.

Also included are an annual chart on sunspots and an annual chart on war.

Monthly figures for other series are given below.

G. Shirk

LATE FIGURES

For those of you who are following any of the series we review from time to time in this section, the recent figures are reported below.

Series	Unit	1958 Month	Amount
Automobile Factory Sales	Thousands of Cars	March r	359
		April p	317
Bond Yields--Moody's All Groups	Per Cent	April p	4.02
		May p	4.00
Copper Prices—Electroyltic, New York	Cents per pound	April	24.25
Corn Prices—#3 yellow, Chicago	Cents per bushel	April r	128.8
		May p	132.1
Egg Prices--Extras, Wholesale, Large, Chicago	Cents per dozen	April	38.0
Liabilities of Business Failures— Dun & Bradstreet	Million dollars	April	84
Residential Building Contracts—F. W. Dodge	Million dollars	March	1,071
Sunspot Numbers (also see the yearly chart on page 174)	Numbers	January	203
		February	152
		March	189
Wheat Prices—#1, Dark Northern Spring, Minneapolis	Cents per bushel	April	241.7

r - revised
p - preliminary

STOCK PRICES

In the April 1958 issue of *Cycles* we published a story which projected to 1990 the combination of 11 stock price cycles. The original study was made in 1944. Recent revisions have made only slight changes.

The projection as actually made in 1944 would have been profitable if you had used it since that time as your guide. (Your gains on completed transactions would have been 185 times your losses.)

Viewed from today and looking backward all the way to 1871, the combination also would have been profitable.

It is true that prior to 1944 this sort of review is pure hindsight. However, in evaluating any analysis, one of the aspects you study is how well it would have worked in the past.

The table on the opposite page is a Buy-Sell table recording imaginary transactions based on the combination of the 11 cycles since 1871.

The total profit over the entire period would have been 1,268%, or about 14.5% a year. Of the 20 transactions only one showed a loss.

The table is based on the turning points of the line showing the combination of the 11 cycles. This combination is drawn on the chart below by means of a broken line.

The actual index at each "ideal" turning point is shown in the table. These index values determine the gain or loss for the imaginary transactions.

The solid line on the chart shows actual prices with growth trend removed.

The turning points that have been selected are marked by letters in chronological order on the chart.

The lengths of the 11 cycles that are combined to make the broken line on the chart are as follows:

4.89 years
5.50
5.91
6.86
8.17
9.18
11.0 years
12.8
14.5
22.0
27.0

A combination of cycles, none of which is under 4.89 years in length, will obviously show only the very broad sweeps of the market. None of the shorter cycles is taken into account here.

The figures we use are the annual averages of the Standard and Poor's Combined Index. The table does not show the profit that would result from the selection of the high month during the year of high and the low month during the year of low.

The study is not intended to do more than define the general market direction. If the combination does as well in this respect in the future as it did in the past, we will be well satisfied.

At the present time the combination of cycles is going downward toward a low which will come "ideally" at 1960. This gradual slide will not be continuous. The actual index will undoubtedly bounce around above and below the combination line.

The total amount of the decline may not be as great as indicated because of other long cycles we have not included yet.

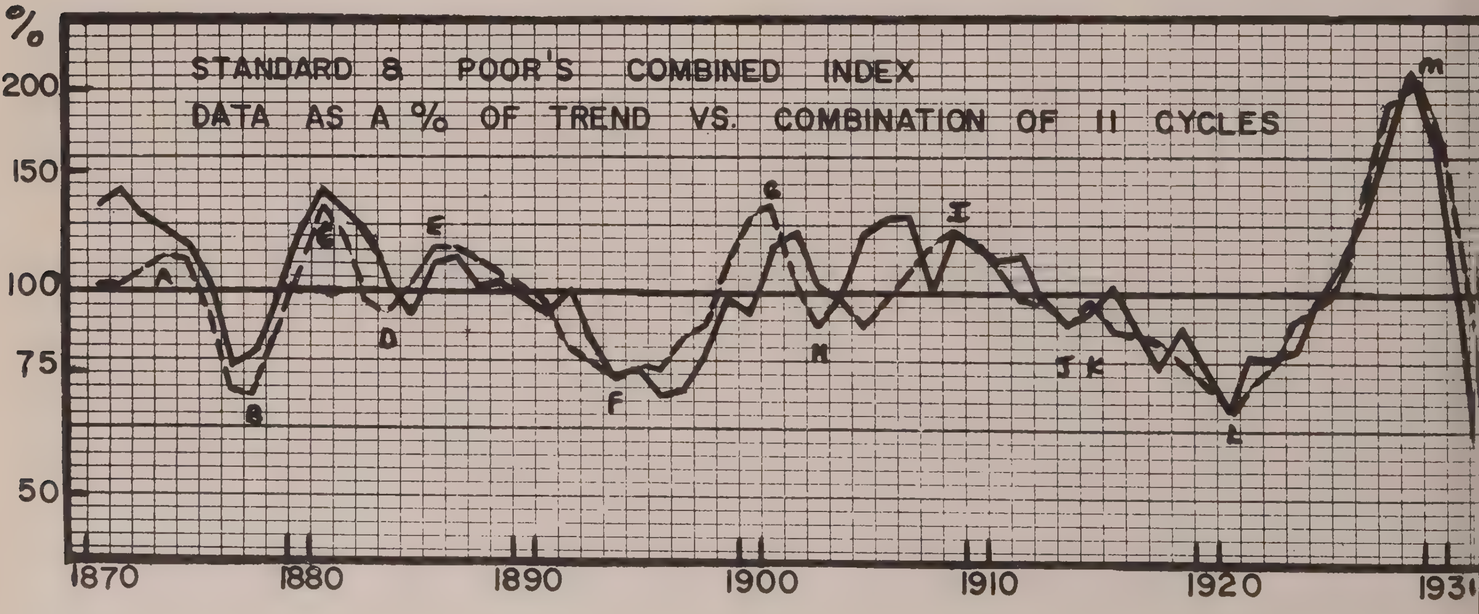
The year of low may not be 1960 because you cannot ignore all the short cycles and expect to obtain exact timing.

But, if the cycles we have isolated and combined here are real and continue to operate, the general contour of the actual line in the future should match our combination line.

The Index for the month of May was 43.74 (preliminary).

For more details on this work see "A Projection to 1990 of 11 Stock Price Cycles and the Underlying Growth Trend" in the April 1958 issue of *Cycles*.

E. R. Dewey

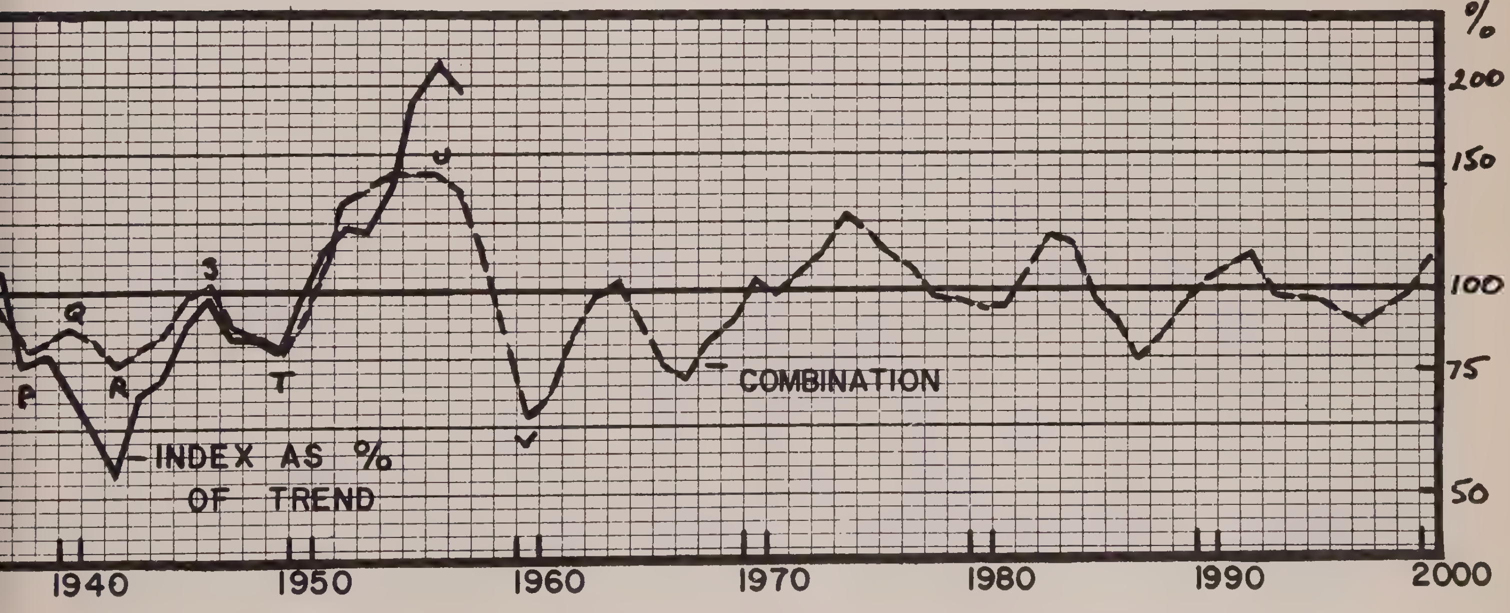


Standard & Poor's Combined Index 1941-43=10

GAIN-LOSS TABLE BASED ON THE COMBINATION OF 11 CYCLES

Turning Points			Long				Short				Gain or Loss	
					Gain or Loss				Gain or Loss			
Point on Chart	Date		Buy	Sell	Amount	%	Short	Cover	Amount	%	Round Trip	Cumulative
A	1874	High					4.57					
B	1878	Low	3.38					3.38	1.19	35.2		
C	1881	High		6.25	2.87	84.9	6.25				120.1	
D	1884	Low	4.74					4.74	1.51	31.9		
E	1886	High		5.36	0.62	13.1	5.36				45.0	165.1
F	1894	Low	4.39					4.39	0.97	22.1		
G	1901	High		7.84	3.45	78.6	7.84				100.7	265.8
H	1903	Low	7.21					7.21	0.63	8.7		
I	1909	High		9.71	2.50	34.7	9.71				43.4	309.2
J	1914	Low	8.08					8.08	1.63	20.2		
K	1915	High		8.31	0.23	2.8	8.31				23.0	332.2
L	1921	Low	6.86					6.86	1.45	21.1		
M	1929	High		26.02	19.16	279.3	26.02				300.4	632.6
N	1933	Low	8.96					8.96	17.06	190.4		
O	1936	High		15.47	6.51	72.7	15.47				263.1	895.7
P	1938	Low	11.49					11.49	3.98	34.6		
Q	1940	High		11.02	-0.47	-4.1	11.02				30.5	926.2
R	1942	Low	8.67					8.67	2.35	27.1		
S	1946	High		17.08	8.41	97.0	17.08				124.1	1050.3
T	1949	Low	15.23					15.23	1.85	12.1		
U	1956	High		46.62	31.39	206.1	46.62				218.2	1268.5
V	1960	Low										

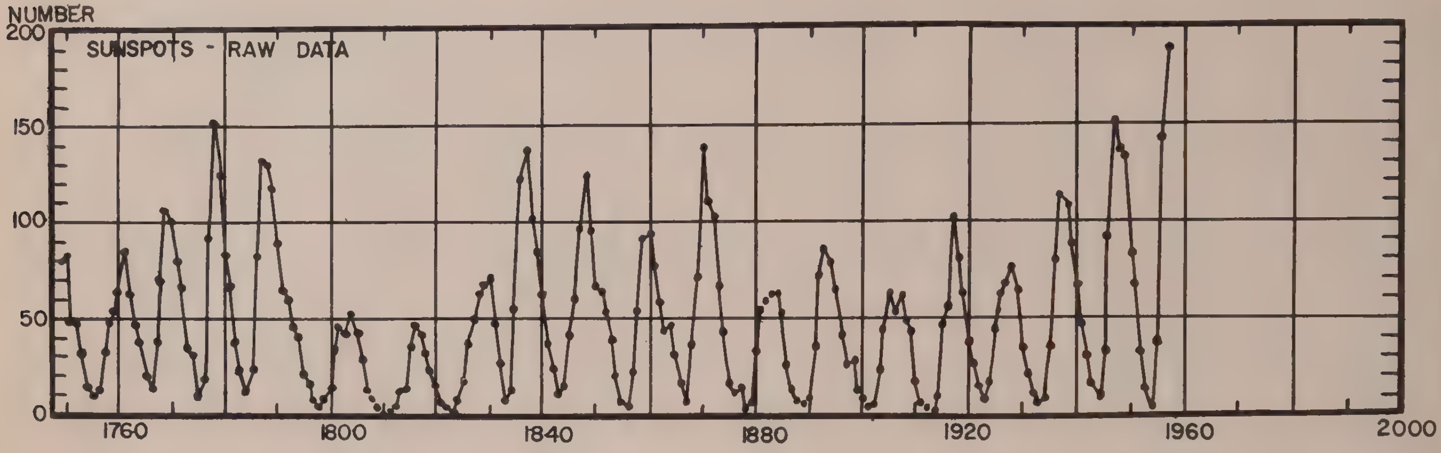
Long: 865.1% gain in 10 transactions, or 86.5% gain per transaction.
Short: 403.4% gain in 10 transactions or 40.3% gain per transaction.
Yearly: Total gain 1268.5% in 87 years or 14.5% gain per year.



SUNSPOTS

From time to time in this section we have published relative sunspot numbers for recent months and some of the past years.

The chart below diagrams the complete record of sunspot numbers which is available. The figures plotted are yearly averages for the years 1749 through 1957. Recent monthly figures are quoted on Page 171 of this issue.



WAR

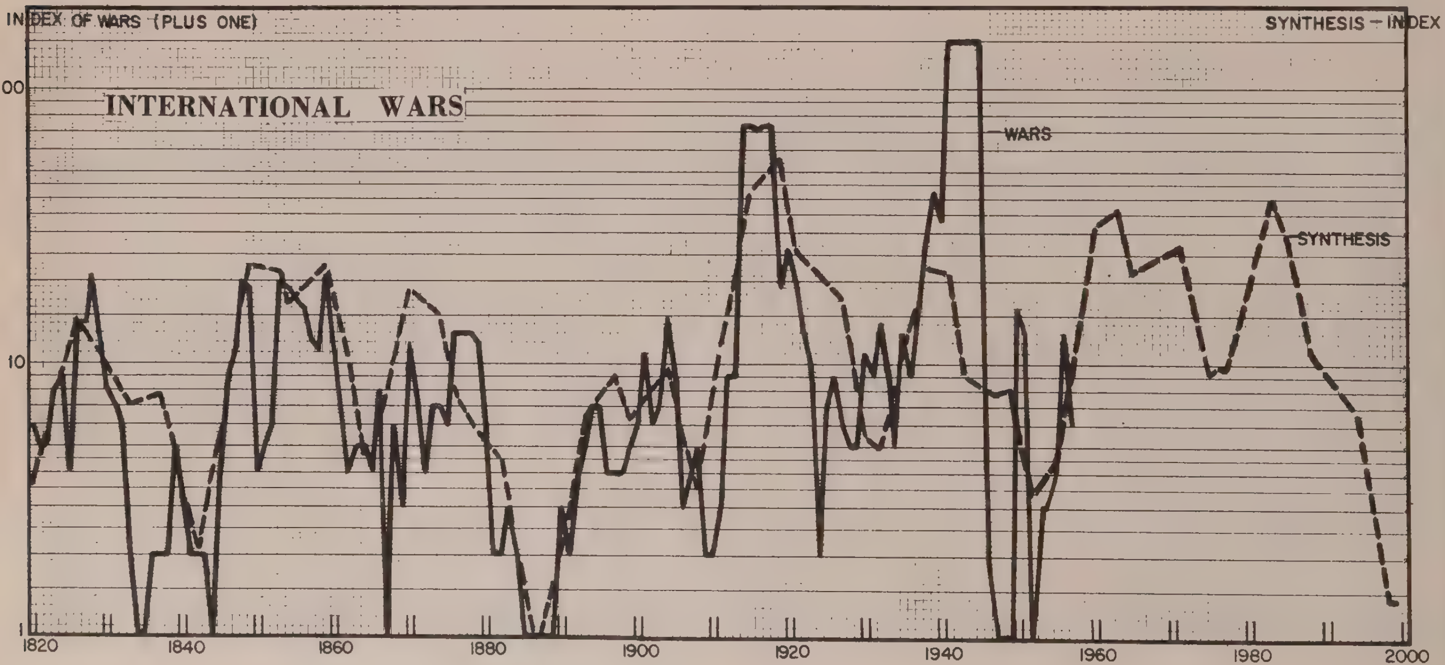
For the benefit of our new members we are reprinting the summary chart from the article "What's Ahead for War?" which appeared in the February, 1958 issue of *Cycles*.

The solid line is the Index of International Battles developed by Professor Raymond K. Wheeler of the University of Kansas.

This index goes back year by year to 599 B.C. The work we have done includes 2,556 years of experience.

The broken line is the combination of the four cycles we have isolated in this series. These cycles are 11 1/5, 22 1/7, 57 and 142 years long.

The combination is going up at the present time. The curve is rising rapidly toward a high level during the early 1960's.



ALUMINUM PRODUCTION

Aluminum production in the United States has grown so tremendously that growth can be called the major characteristic of the industry.

However, aluminum production has also evidenced a strong 6.4-year cycle. This cycle is now in a downward phase.

The strength of the 6.4-year cycle is, on the average, 26% above trend at time of high and 21% below trend at time of low.

Despite the large amplitude of this cycle, the rate of growth of aluminum production has been so sharp that the cycle is not evident until growth is reduced to a level line.

The effect of the combined growth and cycle in the past has been that the down-legs of the cycles have usually been sideways rather than downward moves.

However, as the growth curve of aluminum flattens, the cycle should become more pronounced in the original data.

A picture of the cycle over the entire period studied is reproduced across the bottom of the page. In this chart trend is reduced to a horizontal line at 100%.

The solid line shows the data expressed as a percentage of trend. The broken line is the ideal 6.4-year cycle.

The small chart at the right magnifies the current phase of the 6.4-year cycle. The broken line on this chart is the cycle combined with an estimate of trend. It is compared to the actual monthly data which is shown by the solid line.

That is, we took the cycle for the 1952-1960 period and wrapped it around an upward tilting trend line.

The trend line used allows a considerable reduction in the rate of growth of aluminum production and may have been flattened too much.

The next ideal low in the 6.4-year cycle is at 1959.5. At the low points the cycle is 79.4% of trend, on the average.

The estimated trend we used has a value of 133 thousand tons per month at this point. Thus the approximate level of aluminum production would be 106 thousand tons per month. This is the average of the year centering at the middle of 1959.

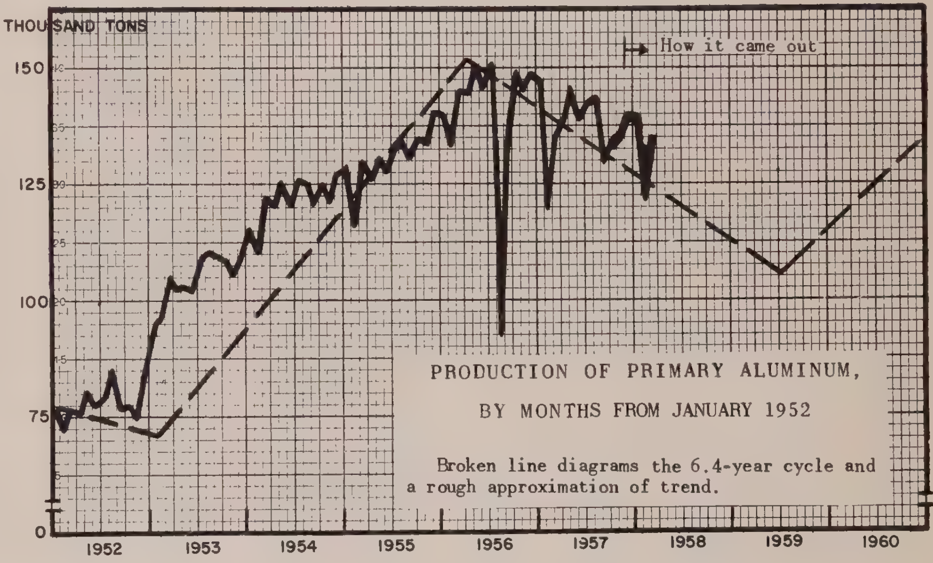
This will be true if the trend level we have used is correct, and if the 6.4-year cycle functions perfectly.

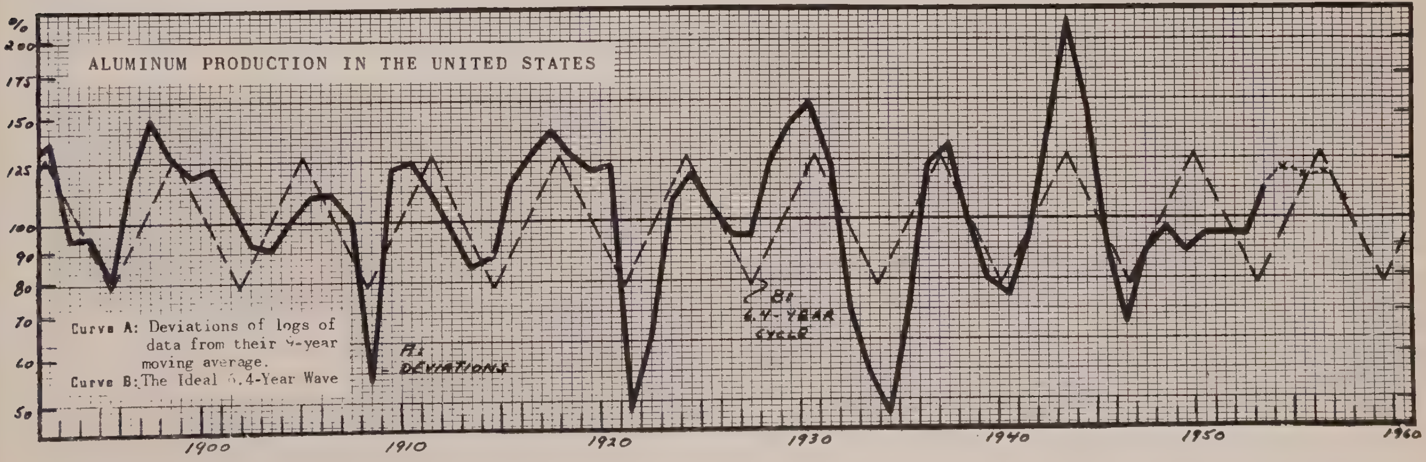
Recent monthly aluminum production figures have been:

1957 - Dec. 140 thousand tons
1958 - Jan. 140
Feb. 122
Mar. 134

For more details on this cycle see "What's Ahead for Aluminum Production?" in the March 1958 issue of *Cycles*.

G. S.





Library Additions

Ecology

"Is There a Physiology of Season?" by Edmund Hughes, from the *Journal of Human Ecology*, Volume III, Number 2. 1953. Published by the Weather Science Foundation, Crystal Lake, Illinois.

Ecology is the study of the influences of the environment upon behavior. This paper traces the seasonal pattern of physiological changes in human beings.

Geology

"Geologic-Climatic Dating in the West" by Ernst Antevs. Reprinted from *American Antiquity*, Volume 20, No. 4, Part 1. April 1955.

Mr. Antevs is concerned with dating the cycles of drought. The record of the number of cycles, the geographic range of the drought areas, and the duration of the dry periods are not adequately known. More work is necessary to correlate cycles and drought, but this work gives an excellent summary of what has been done.

Most of the paper deals with scientific methods of geological-climatic dating. An extensive bibliography is included.

Politics

"The Changing Party Pattern" by Paul T. David. An article from *The Antioch Review*, Vol. XVI, No. 3 (Fall, 1956), Yellow Springs, Ohio. Reprinted by the Brookings Institution, Washington 6, D.C.

In this paper Mr. David states that turning points in United States political history seem to come about every 20 to 30 years. He uses four critical dates to separate periods in American history which he says are distinctly different from each other.

The dates are 1830, 1862, 1894 and 1926. These dates mark off four periods of 32 years each. Each period covers about a generation and includes eight presidential elections. Although this spacing is probably accidental—if it is a 32-year wave there are only four repetitions—the timing puts the date of the next fundamental change at 1958.

Weather

"Investigations into Periodicity of the Annual Range of Air Temperature at State College, Pennsylvania" by Victor Conrad. Pennsylvania State College Studies, No. 8. 1940. (Pennsylvania State College is now called Pennsylvania State University.)

Dr. Conrad made a study of a 53-year record of the temperature range at University Park, Pennsylvania. (Formerly called State College.)

A periodogram analysis gave a result of 17 years. The use of the autocorrelation method gave a wave of 2.4 years in length.

* * * *

"Sixty-Year Weather Forecasts by C. G. Abbot, Research Associate, Smithsonian Institution. The Smithsonian Miscellaneous Collections, Volume 128, No. 3. Published by the Smithsonian Institution, 1955. City of Washington.

Dr. Abbot made a study of precipitation in St. Louis. The data covered a period of 100 years. By using a family of regular periodicities he has developed a method of forecasting precipitation which has worked well in 70 of the 100 years.

Biology

"Mice and Men" by Julian Huxley. From *Harpers Magazine*, December, 1927.

This is a discussion of the recurring plagues of mice and other small rodents which periodically devastate crops and spread disease.

Tree Rings

"Treering Measurements in Java and the Sunspot cycle from A. D. 1514" by J. D. De Boer. A reprint from the *Proceedings of the Royal Netherlands Academy of Sciences* at Amsterdam. Series B, 55, No. 4. 1952.

Dr. De Boer speaks here of an 89-year cycle in weather in Java as evidenced by tree rings. He also found a 51-year cycle and an 11-year cycle in the same data.

Fish

"Fluctuations in Abundance of Pacific Halibut" by Martin D. Burkenroad. Reprint from *Bulletin, Bingham Oceanographic Collection*, Vol XI. May, 1948.

Mr. Burkenroad mentions a cyclical fluctuation in the population of halibut with a period of about 34 years.

Geophysics

"The Nature of the Solar Cycle" by W. S. Adams and S. B. Nicholson. A reprint from the proceedings of the *National Academy of Sciences*, Vol. 19, No. 3. March, 1933.

An explanation of the development of indexes used to measure solar activity. Also includes some discussion of the cycles in sunspots.

Geisinger Indicator

BACKGROUND

The Modified Geisinger Indicator is a series of numbers which, in the past, have gone up and down ahead of corresponding movements of the Federal Reserve Board Index of Industrial Production. The Modified Geisinger Indicator thus throws some light on the probabilities of the future.

The F. R. B. Index of Industrial Production measures physical production in the U. S. A. It is a weighted average of tons, yards, gallons, and numbers of things produced each month.

The Modified Geisinger Indicator is the sum of two Indicators, the Geisinger Indicator and a First Difference Indicator.

The Geisinger Indicator was invented by Robert Geisinger. It is derived from figures which are published each month in the *Survey of Current Business*. It is charted for you as Curve A on pages 178 and 179.

Curve B on these same two pages charts the First Difference Indicator, which is merely the amount by which the smoothed F. R. B. Index is above or below the value for the preceding month. The smoothing is effected by means of a centered 3-month moving average posted to the second position.

Curve C charts the sum of the values of Curve A and B. This curve is called the Modified Geisinger Indicator. It suggests in a general way what the F. R. B. Index may do some eight months later.

Curve D charts the values of the F. R. B. Index of Industrial Production smoothed.

Curve E re-charts Curve C, advancing it by 8 months. This advance is for two reasons (1) so that you can more easily compare the past behavior of the Modified Geisinger Indicator with the behavior of the F. R. B. Index, and (2) so that you can have a better idea of what the F. R. B. Index may do in the future.

FORECAST

The F. R. B. Index of Industrial Production has now dropped to 126, the lowest value for 3½ years. The drop from the peak (147 in December of 1956) is 14%. Further decline is to be expected.

The Geisinger Indicator, however, is *up* from its low of -4.2 in November (July 1958 when projected) to preliminary values of -2.6 for February (October 1958 when projected) and -2.4 for March (November 1958 when projected).

The 1st Difference Indicator is *up* from its low of -3.00 in December and January (August and September 1958 when projected) to a value of -2.66 for February (October 1958 when projected) and a preliminary value of -2.33 for March (November 1958 when projected).

The turn has definitely come in both of these indicators. This fact suggests that an upturn—or at least a pause in the decline—in the Index of Industrial Production may come in the autumn.

Every decline contains within itself the seeds of recovery. The indicators show that this decline is no exception. The seeds are there. Beneath the surface, they are sprouting!

You should remember, however, that both indicators are still at unfavorable levels. Continued caution is indicated. Wait until the Geisinger Indicator achieves a plus value of 2½ or more before settling back into complaisant optimism in respect to the resumption of the boom!

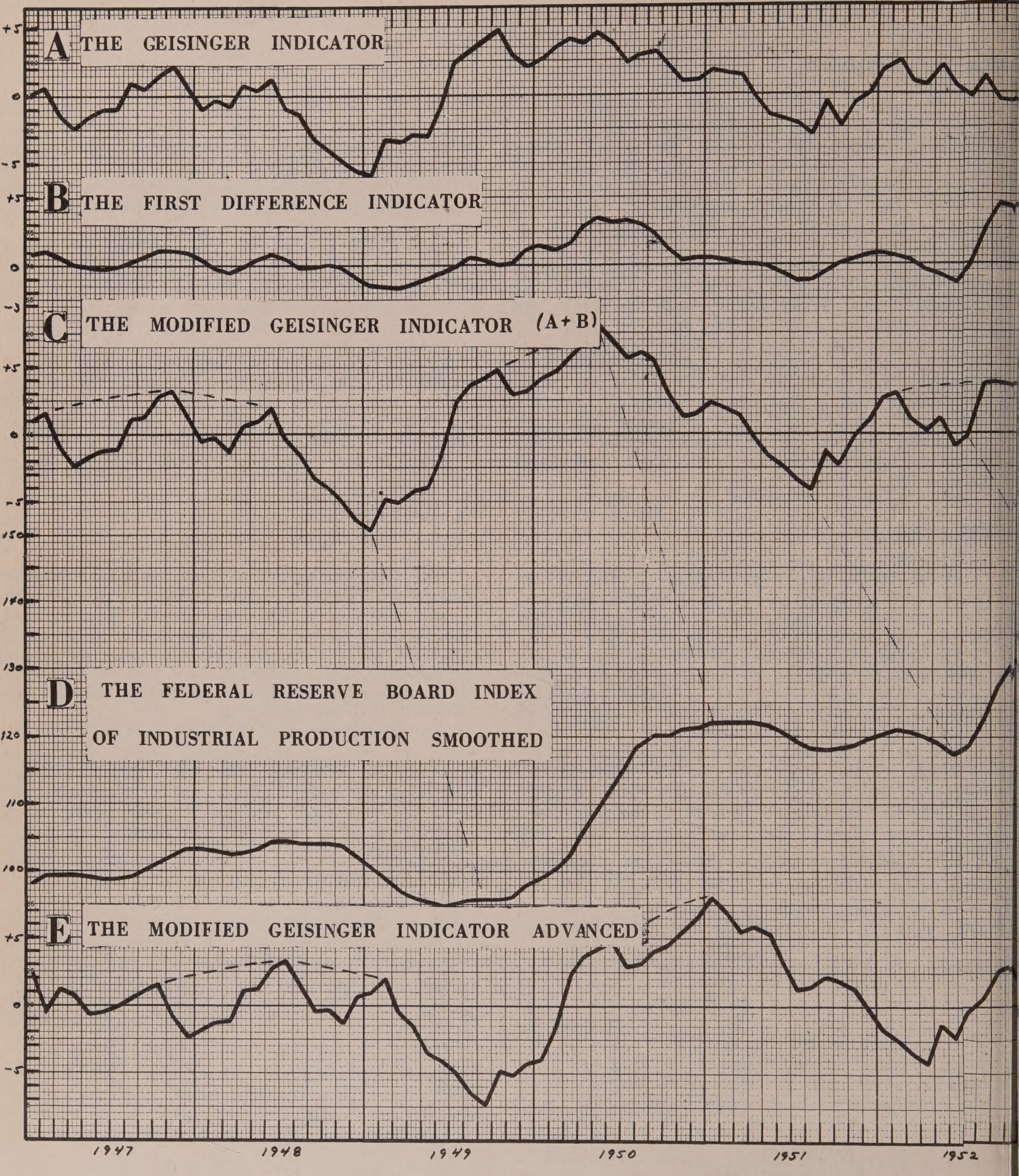
May 29th 1958 *E. R. Dewey*

		Curve A	Curve B	Curve C	
Month	F.R.B. Index	Geisinger Indicator	1st Difference Indicator	Modified Geisinger Indicator	Timing Advanced 8 Months
Oct. 1957	142	-3.4	-1.50	-4.90	June 1958
Nov.	139	-4.2	-2.50	-6.70	July 1958
Dec.	135	-3.6	-3.00	-6.60	Aug. 1958
Jan. 1958	133	-3.8	-3.00	-6.8	Sept. 1958
Feb.	130	-2.6p	-2.66	-5.26p	Oct. 1958
Mar.	128	-2.4p	-2.33p	-4.73p	Nov. 1958
Apr.	126p	*	*	*	

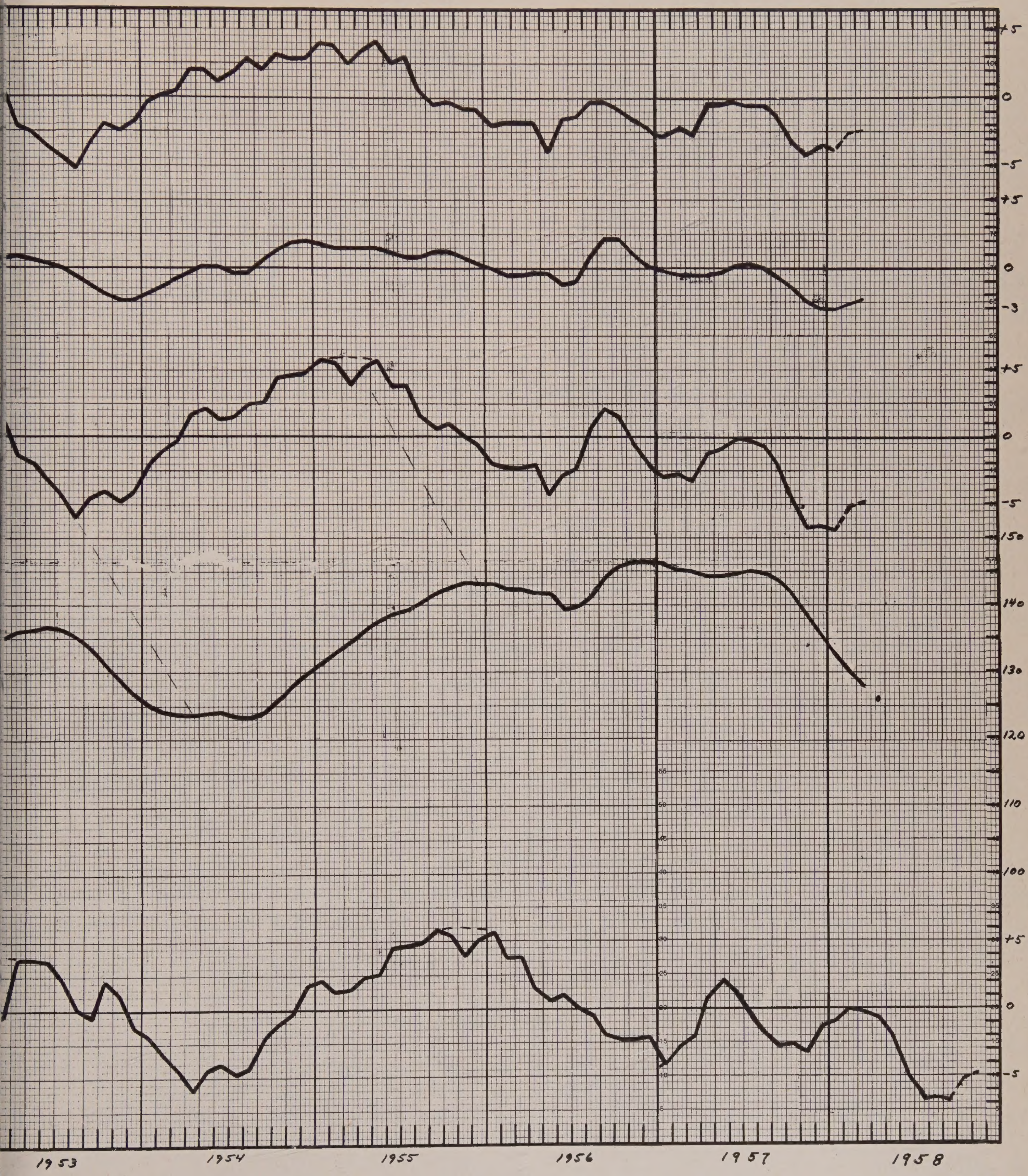
p - preliminary

* - not yet available

THE MODIFIED GEISINGER INDICATOR



OF INDUSTRIAL PRODUCTION



Turn to page 177 for the forecast.

Mr. H. A. Musham
741 No. Rush St.
Chicago, Ill.

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